

Elderly Caregivers' Knowledge and Practice toward Pressure Ulcers at Sohag Governorate Hospitals

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Abstract:

Background: Pressure ulcers are more common among elderly. A major public health concern, pressure ulcers can cause psychological and physical problems that have an impact on morbidity and death. **Aim:** To assess elderly caregivers' knowledge and practice toward pressure ulcers at Sohag governorate hospitals. **Design:** Descriptive research design. **Setting:** Sohag Governorate Hospitals: From the Eastern direction: Sohag University hospital and Akhmim central hospital, while from the Western direction: Sohag General Hospital and Sohag Teaching hospital. **Sample:** Random sample was used to select two hospitals from each direction, then appropriate convenient sample used to select the elderly patients during six months. **Tools:** **Tool (1):** Structured interview questionnaire: it includes two parts: **Part I:** Demographic data and medical history of elderly. **Part II:** Demographic data of elderly caregivers. **Tool (2):** Elderly caregivers' knowledge about pressure ulcer structured questionnaire. **Tool (3):** Elderly caregivers' practice about pressure ulcer observational checklist. **Results:** 71.0% of the studied elderly caregivers in the current study had unsatisfactory knowledge level toward pressure ulcers, while 29.0% of them had satisfactory knowledge level. Additionally, 77.5% of studied elderly caregivers had inadequate practice, while 22.5% of them had adequate practice. **Conclusion:** Elderly caregivers had unsatisfactory level of knowledge and inadequate practice level toward pressure ulcers. Also, there was positive correlation and highly significant difference between the studied elderly caregivers' knowledge and practice toward pressure ulcer. **Recommendation:** Establishing training and educational program about pressure ulcer for elderly caregivers.

Keywords: Elderly caregiver, Knowledge, Practice & Pressure ulcers.

Introduction:

Aging is defined as a person's progressive physiological changes that result in senescence, or a reduction in biological functioning and metabolic stress tolerance. As time passes, aging occurs in a cell, an organ, or the entire person. Any living creature goes through this process for the duration of its adult existence. Aging is a person's gradual or progressive transformation that raises their risk of illness, mortality, and debility. This is how the aging process manifests itself in senescence. Age-related changes in the motor function of several body systems are linked to normal aging, and some of these significant motility changes may occur (Cai et al., 2022).

Human skin changes in distinctly noticeable ways as we age. The aging process of skin is characterized by a constant decline in cell replacement, poor barrier function and mechanical protection, delayed wound healing and immunological responses, altered thermoregulation, and decreased production of sweat and sebum. Features including wrinkles, elasticity loss, laxity, and a rough-textured appearance are indicative of aging skin (Mohiuddin., 2019).

A pressure ulcer (PU), often called a bedsore or decubitus ulcer, is a skin injury brought on by prolonged, continuous pressure on a particular area of the skin. According to estimates, the prevalence of pressure ulcers varies between therapeutic settings and can range from 4% to 38%. Approximately 68% of older people die as a result of pressure sore complications. Patients who were on prolonged bed rest frequently developed pressure ulcers (Mir et al., 2023).

PU is a small region of tissue injury caused by direct pressure and/or shearing forces that typically occurs over a bony prominence. Both pressure and shear cause soft tissue to distort, and both can cause ischemia over time or even cause cell death as a result of the deformation itself (Källman et al., 2022). The prevalence of PU in healthcare settings varies greatly between nations and clinical settings, ranging from 0% to 72.5% worldwide. People with pressure ulcers frequently exhibit impaired mobility and decreased tissue tolerance (Moore et al., 2023). About 70% of pressure ulcers occur globally in the elderly population over 65, with 5-32% of geriatric patients receiving care in hospitals and 9-22% of PU patients

being residents of nursing homes (Awad& Hewi., 2020).

The degree of tissue damage determines how pressure ulcers should be treated. Using the appropriate antibiotics and dressings, pressure ulcers at Stages 1 and 2 can be conservatively treated, depending on the wound's size, shape, depth, location, and exudate presence or absence. Almost always, surgical intervention is required when ulcers reach Stages 3 or 4. After performing traditional local debridement, reconstruction takes place (Mir et al., 2023). There are currently no clinically proven methods for preventing or minimizing the incidence of PU. Therefore, combining clinical and conventional health technology solutions is one novel strategy for controlling and preventing pressure ulcers (Rêgo et al., 2023).

Elderly caregivers must receive enough training in order to convey the findings of their assessment to all relevant parties in a clear, comprehensive, and understandable way. The most crucial thing is to train the caregivers in elderly care as well as timely reporting and communication techniques that will improve patient safety. Caregivers' understanding of skin care will enable them to recognize improvements in the physical well-being of senior citizens (Alhammadi et al., 2020). A few benefits of providing care at home include strengthening family ties and reaffirming cultural norms around honoring and taking care of family members (Zhong et al., 2020).

One important factor in preventing PU is caregivers. Caregivers can help patients achieve the best quality of life and pass away peacefully, comfortably, and with dignity if they are educated about PU prevention (Antony et al., 2022). Informal caregivers are frequently ill-prepared to offer care at home, but they do need specialized training and expertise to carry out certain healthcare services. Therefore, it is necessary to educate family caregivers about PU prevention and management options in order to boost their confidence and competence in providing patient care (BaniHani et al., 2023).

Informal caregivers are frequently ill-prepared to offer care at home, but they do need specialized training and expertise to carry out certain healthcare services. Gaining knowledge and abilities enables unpaid caregivers to deliver quality care with the least amount of unfavorable effects. Because of this, the lack of knowledge among informal caregivers about PU prevention and management led to a series of crises during the entire caregiving process. Taking care of terminally ill patients with PU at home places a burden on informal caregivers because they are ill-equipped to use risk assessment scales correctly or predict the development of PU before it occurs.

Therefore, family caregivers need to be educated about PU prevention and management options in order to boost their confidence and improve their knowledge of how to care for patients (BaniHani, et al., 2023).

Gerontological nurses act as assisting by moving and rearranging the bed, making sure there are no wrinkles in the bed, observing that no bony prominences are compressed, utilizing cushions, pillows, or pressure-relieving assistive devices, moving the elderly people using lifting equipment and changing sheets, preventing friction or shear during ambulation and keeping the skin dry after incontinence. Also act as observing by checking for any changes in the color of the wound dressing, redness of the skin, bad wound odor, and the presence or absence of pain. By observing them, medical professionals may be able to find new wounds as well as ones that are getting worse or healing. Coaching through being very helpful in advising senior citizens and those who look after them to change positions at least every two hours and to maintain healthy diet and hydration (Sultana et al., 2022).

Significance of the study:

PU is now a well-known, avoidable patient safety issue on a global scale. It is also among the top five community-related causes of patient injury. The cost of treating pressure sores is 2.5 times greater than the cost of preventing them (Boyko et al., 2018). There is a significant difference in the prevalence of pressure ulcers between developed and developing nations, with developed countries having an estimated incidence rate of 25.1% and developing countries having a rate of 31.3% (Fletcher & Hall., 2018).

Patients admitted to hospitals across various nations have PU rates ranging from 3% to 53%. Compared to developed nations, less developed and underdeveloped nations have higher PU levels. For instance, PU prevalence in German hospitals was reported to be between 2% and 5%, whereas in African nations, the number was as high as 44%. 19.57% was reported as the average prevalence of PU in Iranian hospital intensive care units (Amini et al., 2022).

Most of the time, pressure ulcers can be avoided with the right preventive techniques. Prevention of PUs is crucial and demonstrates the caliber of care; in addition to financial costs, PUs can result in human misery, agony, and a decline in the patients' quality of life in terms of their health (Parisod et al., 2022). From the clinical experience and observation of the researcher. Because elderly patients at Sohag hospitals have a high incidence of pressure ulcers, it was discovered that many of these patients were

elderly and suffering from a variety of pressure ulcer-related issues.

Aim of the study:

Assess elderly caregivers' knowledge and practice toward pressure ulcers at Sohag governorate hospitals.

Specific objectives:

- To assess knowledge level of elderly patient's caregivers toward pressure ulcer.
- To assess practice level of elderly patient's caregivers toward pressure ulcer.

Research question:

- 1- What is the level of knowledge of elderly caregivers toward pressure ulcer?
- 2- What is the level of practice of elderly caregivers toward pressure ulcer?

Subjects and method

Research design:

In this study, a descriptive research design was adopted. When using a descriptive research design, a topic is observed and data is gathered without an attempt to infer cause-and-effect relationships. Descriptive research aims to characterize the relationships, patterns, and trends found in the data while presenting a thorough and accurate picture of the population or phenomenon under study (Indriati et al., 2022).

Study setting:

The study was conducted at Sohag Governorate Hospitals: It was randomly selected two hospitals in each division. From the Eastern direction of governorate (Sohag University hospital and Akhmim central hospital), While from the Western direction of governorate (Sohag General Hospital and Sohag Teaching hospital). It was randomly select three departments in all hospital as: (Neurological department, department of Internal Medicine, and Orthopedic department). Sohag General Hospital: It is located in Sohag - Al-Aref - in front of the bus stop. Sohag Teaching Hospital: It is located in Sohag, West Nile banks, western district. Sohag University Hospital: It is located in Nasser City, Sohag Governorate. Akhmim central hospital: It is located in Sohag - Akhmim - Nasser Agricultural Road.

Subjects:

Elderly patients' caregiver who attended to the previous mentioned setting.

Inclusion criteria: The study had the following inclusion criteria:

Inclusion criteria of caregivers:

1. Caregivers' of elderly patient relative.
2. The participant who able to verbally communicate with the interviewer.
3. The participant who has the time and willingness to participate in the study.

Inclusion criteria of the elderly:

1. The elderly are 60 years and above.
2. The elderly are bedridden.
3. The elderly patient needs caregiver partially or completely.
4. Elderly willing to participate in the study.

Exclusion criteria of the elderly caregiver:

1. The caregivers who declined to take part in the research.
2. Caregivers whose chronic illnesses make it difficult for them to give their patients the care they need.

Sampling:

Type of the sample:

A random sample was used to select hospitals and departments. The appropriate convenient sample was used to collect the studied elderly sample, which is a non-probability sampling method where data is collected from an easily accessible and available group of people.

Sample size: The actual size of sample obtained from elderly patients and their caregivers in duration of 6 months from previous mentioned setting. The studied sample was 200 participants (elderly patients and their caregiver). The study started after the accreditation of research study permission for data collection from President of Sohag University and undersecretary of the Ministry of Health at the end of December 2022, and started on the first of January 2023 and ended at the end of June 2023.

Sample Size:

Epi-info program will use to estimate the subject size; the minimal sample is based on the following parameters.

- Population size =600
- Expected error = 5%
- Confidence coefficient =95%
- Population size After Inclusion criteria =350

The total numbers of people who admitted in Sohag hospitals are 350, by using software EPI/Info, version 3, 3 with 95% confidence interval (CI), the estimated sample size found to be 350 person. To compensate the drop out (10%) will add to the sample size, the final sample size is 200. **The sample was calculated according to the following equation:**

$$n = [DEFF * Np(1 - p)] / [d^2 / Z^2 - a/2 * (N - 1) + p * (1 - p)]$$

DEFF (Design effect) = 1

N (population) = 350

P (Hypothesized %) = 50% +/-5

D (tolerated margin of error) = 0.05

Z (level of confidence) = 1.96

α (Alpha) = 0.05

N (Elderly patients) = $[1 * 350 * 50\% +/- 5 (1 - 50\% +/- 5) / ((0.05)^2 / (1.96)^2 - 0.05 * (350 - 1) + 50\% +/- 5 (1 - 50\% +/- 5))]$

N (Elderly patients) = 184

Tools for data collection:

After reviewing related literature, a personal interview will be conducted by the researcher to collect necessary data from elderly patients with pressure ulcers. It includes three tools which used to collect the data of studied sample in the study as follow:

Tool (1): Structured interview questionnaire sheet: it consists of two parts:-

Part I: Demographic data and medical history of elderly: It includes items:

- 1- **Demographic data of elderly patients:** such as (age, sex, marital status, occupation, level of education, income).
- 2- **Medical history:** it include: presence of diseases, type of chronic disease, number of chronic disease, complications with diseases, previous hospital admission.

Part II: Demographic data of elderly caregivers: This section consists of eight (8) items: (Age, gender, marital status, educational status, occupational status, caregiver residence status, elderly living area, relationship between caregiver and elderly patients).

Tool (2): Elderly caregivers' knowledge of pressure ulcer structured questionnaire: It is developed by (Fathia & Mersal., 2014).

Part I: It designed to assess caregivers' knowledge about pressure ulcer, it include: (definition, signs and symptoms, causes, risk factors, treatment and prevention).

Part II: It consists of 18-item closed ended questions. The questionnaire included positive and negative item questions and scores of negative items were reversed. The questionnaire includes 18-items to assess the knowledge level of care and prevention toward pressure ulcer.

Scoring system of this tool:

Types of answers ranging from "correct" to "partially correct" to "incorrect". If the participants choose correct, take 3 degree, partially correct, take 2 degree, and the answer was incorrect, take 1 degree. The questionnaire yielded a total score of full degrees, or 100%. So that the criterion was categorized into two groups: unsatisfactory knowledge level < 60% and satisfactory knowledge level >60%.

Tool (3): Elderly caregivers' practice of pressure ulcer observational checklist: It is developed by (Fathia & Mersal., 2014).

It was implemented to evaluate the degree of practice by asking respondents to specify how frequently they practiced. This is similarly, a 16-item closed ended question. The questionnaire includes 16-items to assess the practice level of care and prevention toward pressure ulcer. It includes keep the patient bed free from crumbles and wrinkles, both of which can irritate the skin.

Scoring system of this tool:

Types of answers ranging from "correctly done" to "partially correctly done" to "incorrectly done ". If the participants choose correctly done, take 2 degree, if answer was partially correctly done, take 1 degree and the answer was incorrectly done, take. The total score of the questionnaire was full degrees which represent 100%. The criterion was categorized into two groups: inadequate practice level < 60% and adequate practice level >60%.

Validity of tools:

Five experts in gerontological nursing at Assuit University evaluated the developed tool to determine its content validity; any necessary changes will be made. Each member was contacted and asked to check the completeness and clarity of the items questioned by reviewing the tool's content and structural design. Every critique and recommendation was taken into account, revised, and the order of some statements was followed appropriately.

Reliability of tools:

The internal consistency of a test or scale was measured using Cronbach's Alpha, which is represented as a number between 0 and 1. Internal consistency is a measure of how closely all of the test's items measure the same idea or construct, and it is thus related to how closely the test's items are related to one another. The researcher measures the internal consistency for tools used and it was (Cronbach's Alpha = 0.789 for knowledge score) and it was (Cronbach's Alpha = 0.824 for practice score).

Method of data collection:**Administrative phase**

Following an explanation of the purpose and goals of the study, the general managers of the hospitals in the Sohag governorate were given formal permission to conduct the research by the dean of the nursing faculty at Sohag University, provided with their cooperation.

Pilot study:

Prior to beginning data collection on 10% of caregivers of elderly patients in the chosen settings, a pilot study was conducted to assess the tools' applicability, feasibility, and clarity as well as to estimate the required time. Analysis was done on the pilot study's data. Participants from the pilot study were included in the final analysis since no changes were made.

Ethical considerations:

The ethical committee of Sohag University's faculty of nursing approved the research proposal. The study subject's continued use of the research is not at risk. Elderly patients with pressure ulcers who wished to participate in the study were informed of its nature and goal before providing their informal consent. The research subjects were given the assurance that no

data would be reused without additional permission. Anonymity and secrecy were guaranteed. Research participants were free to decline participation or to leave the study at any moment, for any reason.

Field of work:

Following a review of the literature and interviews with experts at various levels of the subject, all the data that could be useful in accomplishing the study's goals was gathered, examined, and codified so that it would be appropriate for the study survey. A series of closed-ended and open-ended questions were developed for the questionnaire following several rounds of brainstorming, consulting, and deliberation with the supervisor.

The researcher gathered information for three hours, two days a week, between 10 am to 1 pm. Depending on the patient's cooperation, filling out the questionnaire took fifteen to twenty minutes. The researcher visited the departments that were chosen, made an introduction, provided official authorization, clarified the goal of the study, and requested cooperation. In order to gather the necessary data, the researcher gathered senior caregivers from the waiting areas of the departments that were chosen.

The researcher coordinated with each senior and their caregiver on an individual basis to determine the best time to collect data. The researcher evaluated the elderly caregivers' practices and knowledge regarding pressure ulcers. Every day, the researcher saw roughly four patients. The researcher evaluates the medical history, both current and past, of elderly patients, as well as the site, location, symptoms, and degree of pressure ulcers. Additionally, the researcher evaluates the knowledge and skills of elderly caregivers.

Statistical analysis:

The Statistical Package for Social Science, SPSS version 22, and the Excel 2016 program were used for data entry and analysis, respectively. The right statistical techniques were applied when performing the statistical analysis. i.e., Chi square test, F test to compare study variable means, percentage, range, arithmetic mean (\bar{X}), standard deviation (SD), and so on. The statistical package for social sciences (SPSS) for Windows version 16 was used to analyze the data. A statistically significant P value was defined as one that was 0.05 or lower. In order to visualize data, graphics were created using Microsoft Excel.

Results:

Table (1): Frequency and percentage distribution of the studied elderly demographic characteristics, (N=200).

Elderly demographic characteristics	No	%
Age group		
60-70 years	99	49.5
71-80 years	74	37.0
More than 80 years	27	13.5
Mean \pm SD(range)	71.35\pm6.59(60-88)	
Place of residence		
Urban	106	53.0
Rural	94	47.0
Gender		
Male	115	57.5
Female	85	42.5
Marital status		
Single	1	0.5
Married	153	76.5
Divorced	5	2.5
Widow	41	20.5
Educational level		
Does not read or write	58	29.0
Reads and writes	75	37.5
Basic education	35	17.5
Secondary education	3	1.5
University education or more	29	14.5
Relative living with elderly		
Partner (wife or husband)	75	37.5
Sons	123	61.5
Alone	1	0.5
With a relative	1	0.5

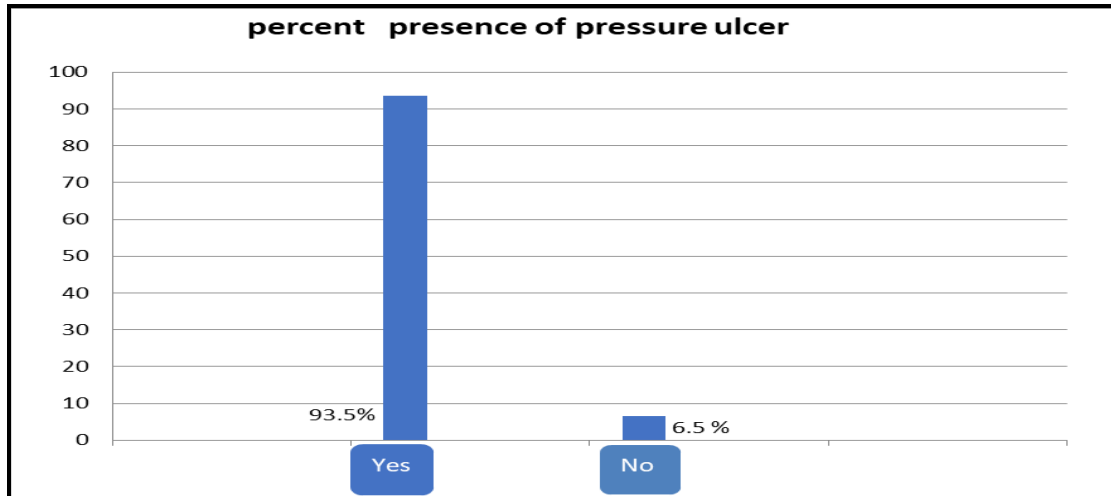


Figure (1): Distribution of studied elderly patients' percent presence of pressure ulcer, (N=200)

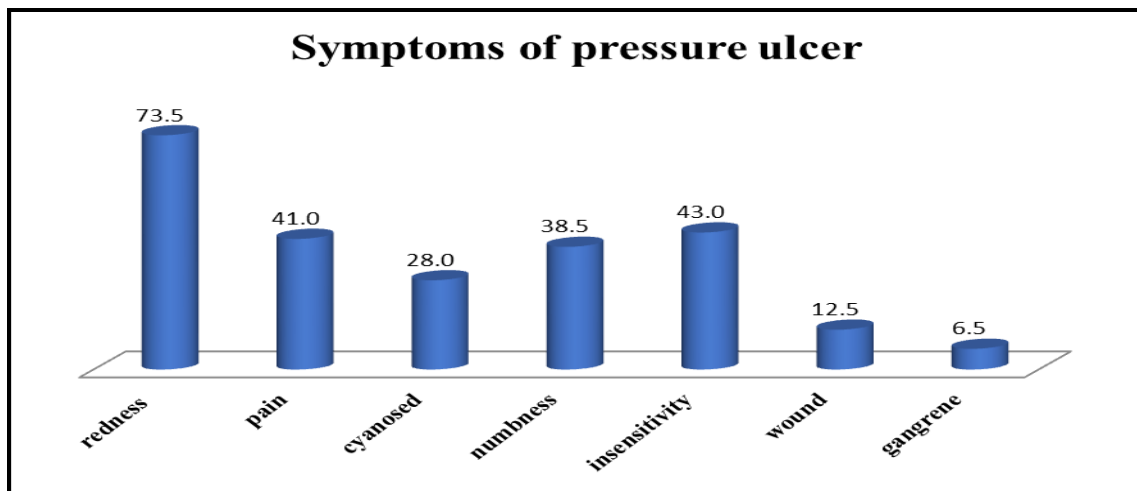


Figure (2): Distribution of the studied elderly patient's symptoms of pressure ulcer, (N=200)

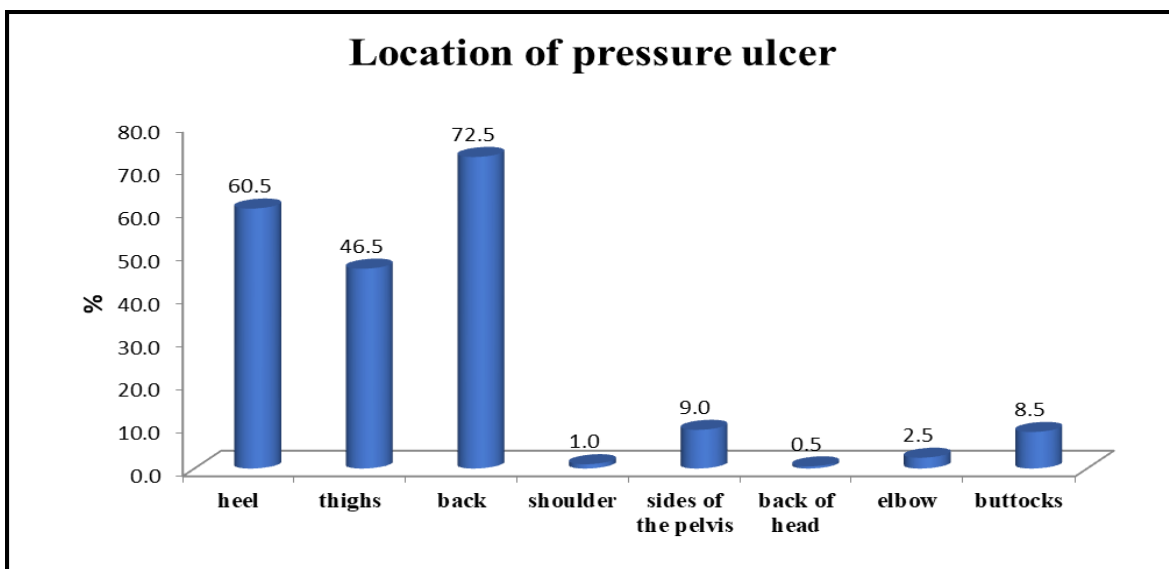


Figure (3): Distribution of the studied elderly patient's location of pressure ulcer, (N=200)

Table (2): Frequency and percentage distribution of studied elderly caregivers' demographic characteristics of studied sample, (N=200).

Caregivers demographic characteristics	No	%
Age caregivers		
18-25 year	37	18.5
26-35 year	126	63.0
More than 35 year	37	18.5
Mean \pm SD(range)	30.50\pm2.26 (18-46)	
Place of residence		
Urban	95	47.5
Rural	105	52.5
Gender		
Male	102	51.0
Female	98	49.0
Employment status		
Housewife	71	35.5
Farmer	22	11.0
Worker	41	20.5
Businessman	54	27.0
Student	12	6.0
Marital status		
Single	41	20.5
Married	154	77.0
Divorced/widow	5	2.5
The educational level		
Does not read or write	15	7.5
Reads and writes	34	17.0
Basic education	104	52.0
Secondary education	6	3.0
University education and more	41	20.5
The state of residence of caregivers		
Lives together with the patient	174	87.0
Lives separately from the patient	26	13.0
The relationship between the caregiver and the elderly		
First degree	125	62.5
Second degree	73	36.5
Other #	2	1.0

Third or fourth degree

Table (3): Frequency and percentage distribution of the studied elderly caregivers' level of knowledge about pressure ulcers, (N=200).

level of knowledge	don't know		Partially Correct		Complete correct	
	No	%	No	%	No	%
Define pressure ulcers	1	0.5	153	76.5	46	23.0
Causes of pressure ulcers	0	0.0	198	99.0	2	1.0
The location of the skin ulcer	0	0.0	195	97.5	5	2.5
Stages of pressure ulcer	79	39.5	101	50.5	20	10.0
Symptoms	14	7.0	185	92.5	1	0.5
Complications of pressure ulcer	71	35.5	129	64.5	0	0.0
People most vulnerable	1	0.5	187	93.5	12	6.0
Pressure ulcer treatment	8	4.0	192	96.0	0	0.0
When to seek medical attention	31	15.5	167	83.5	2	1.0

Table (4): Frequency and percentage distribution of the studied elderly caregivers' level of knowledge, (N=200).

Knowledge items	Incorrect		Partially correct		Correct	
	No	%	No	%	No	%
The patient on a wheel chair should shift their weight approximately every 15 minutes	58	29.0	136	68.0	6	3.0
Turn or reposition patients in bed at least every 2 hours.	45	22.5	143	71.5	12	6.0
When you are assisting a patient with changing position, move the patient carefully	41	20.5	135	67.5	24	12.0
Use of proper transfer techniques can reduce friction of the skin while transferring.	48	24.0	126	63.0	26	13.0
The patient should ensure maximum mobility according to their capabilities.	37	18.5	129	64.5	34	17.0
Avoid applying any lotion to bony prominences or reddened areas, as this may soften or irritate the skin increasing breakdown	46	23.0	135	67.5	19	9.5
The most risky areas to pressure ulcer development such as upper back, should be checked every day.	41	20.5	130	65.0	29	14.5
Avoid overstretching of skin while the patient is repositioned or transferred	51	25.5	125	62.5	24	12.0
Use pillow or cushions to keep bony prominences such as knees and ankles, from direct contact with each other.	47	23.5	125	62.5	28	14.0
Assess weight changes of the patient over time.	50	25.0	131	65.5	19	9.5
Ensure that the patient is well-nourished.	38	19.0	132	66.0	30	15.0
Usually drinking 8 glasses of water everyday will be sufficient.	36	18.0	124	62.0	40	20.0
Repositioning is not necessary to be performed on a bed ridden patient when a special mattress is applied.	53	26.5	138	69.0	9	4.5
To prevent pressure ulcer, a bedridden patient should be dragged slowly for changing the position	75	37.5	113	56.5	12	6.0
While dressing the wound of the patient, hand washing is not necessary if the gloves are worn.	86	43.0	102	51.0	12	6.0
Massage is recommended for reddened body areas in bed ridden patients	73	36.5	107	53.5	20	10.0
The patient on wheel chair has lesser chance of developing pressure ulcer.	65	32.5	114	57.0	21	10.5
The overweight patients should not be given proper balanced diet	60	30.0	130	65.0	10	5.0

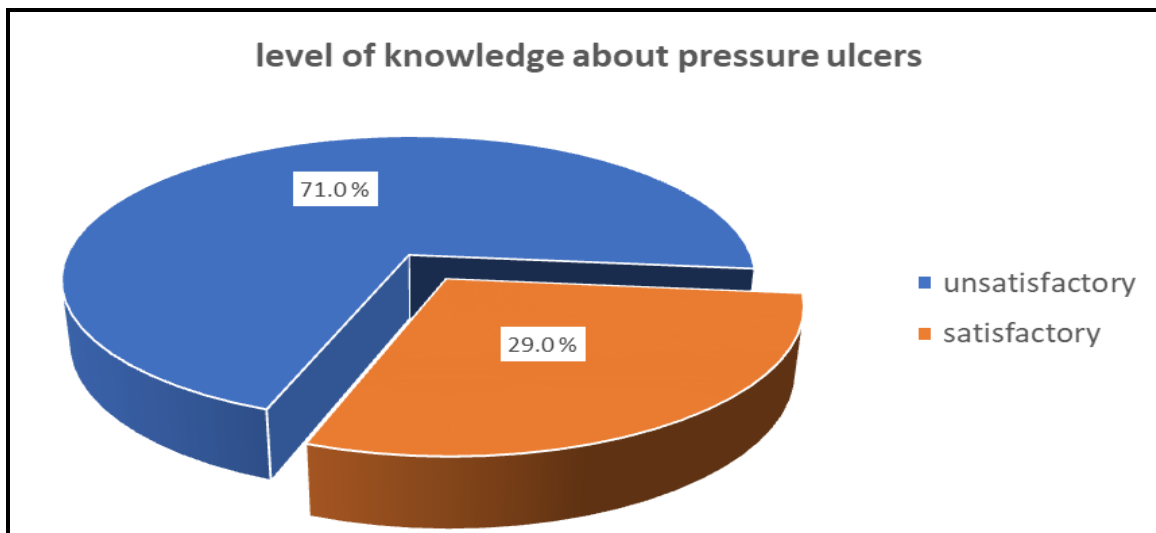


Figure (4): Percentage distribution of studied elderly caregivers' total score of knowledge about pressure ulcer.

Table (5): Frequency and percentage distribution of the studied elderly caregivers practice level about pressure ulcers, (N=200).

Level of practice	Incorrectly done		Partially correctly done		Correctly done	
	No	%	No	%	No	%
Encourage and assist the patient to eat well, drink sufficient fluid, and exercise several times daily	81	40.5	105	52.5	14	7.0
Use pillows and cushions to reduce pressure on existing pressure ulcers or risky skin areas.	69	34.5	118	59.0	13	6.5
Check for incontinence a minimum of every two hours	58	29.0	126	63.0	16	8.0
Do not massage or forcefully rub skin that is at risk of pressure ulcers.	38	19.0	144	72.0	18	9.0
Clean the skin immediately after toileting	50	25.0	134	67.0	16	8.0
Use skin moisturizers daily on dry skin	55	27.5	140	70.0	5	2.5
Consulting a therapist or a doctor noticing any changes on the skin.	60	30.0	130	65.0	10	5.0
Keep the patient bed free form crumbles and wrinkles, both of which can irritate the skin	59	29.5	133	66.5	8	4.0
Encourage patient involvement in activities	83	41.5	113	56.5	4	2.0
Provide clothes made of cotton that is light and soft in texture	61	30.5	125	62.5	14	7.0
Use proper transfer technique to move the patient without sliding across bed or chair surfaces	91	45.5	98	49.0	11	5.5
Relieve pressure from the heels, when the patient is in bed by positioning pillows or cushions	75	37.5	107	53.5	18	9.0
Consider wiping the patient skin sites by using a towel without rubbing the skin	89	44.5	97	48.5	14	7.0
Use a pressure redistributing chair cushion for patients sitting in wheelchair	77	38.5	112	56.0	11	5.5
Do not massage bony prominences or reddened areas of skin	106	53.0	90	45.0	4	2.0
Inspect the skin at least daily for signs of pressure ulcer	70	35.0	114	57.0	16	8.0

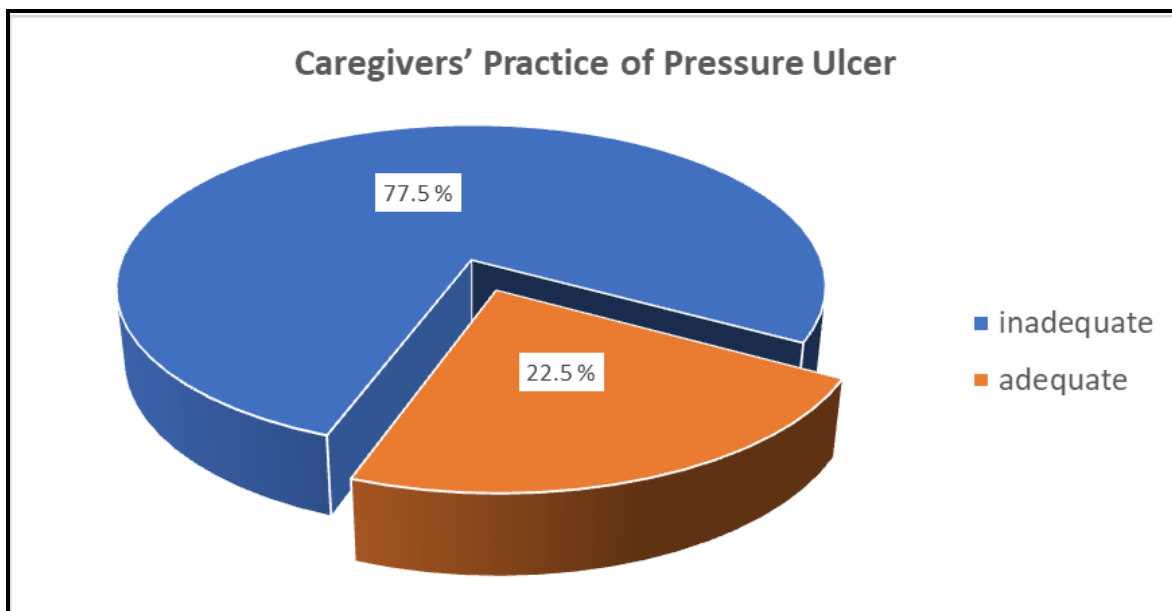


Figure (5): Percentage distribution of studied elderly caregivers' total score of practice of pressure ulcer.

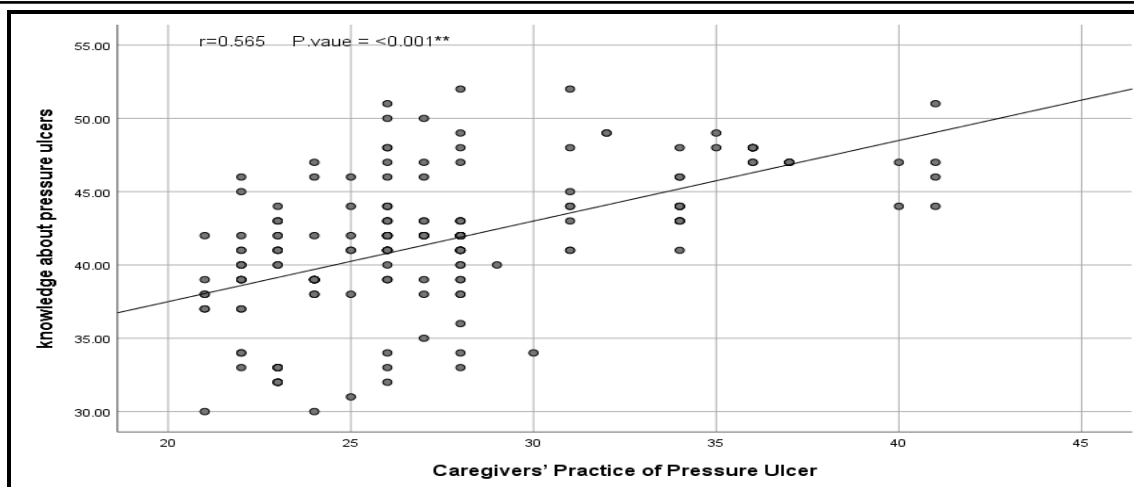


Figure (6): Correlation between the studied elderly caregivers' knowledge and Practice about Pressure Ulcer.

Table (6): Relationship between the studied elderly caregivers' level of knowledge toward pressure ulcers and demographic data, (N=200).

Elderly caregivers' demographic data	level of knowledge about pressure ulcers				X2	P.value
	Unsatisfactory (n=142)		Satisfactory (n=58)			
	No	%	No	%		
Age caregivers						
Less than 25 year	28	19.7	9	15.5	3.37	0.186
From 25-35 year	84	59.2	42	72.4		
More than 35 year	30	21.1	7	12.1		
Place of residence						
Urban	64	45.1	31	53.4	1.16	0.282
Rural	78	54.9	27	46.6		
Gender						
Male	73	51.4	29	50.0	0.03	0.857
Female	69	48.6	29	50.0		
Employment status						
Housewife	61	43.0	10	17.2	65.78	<math>< 0.001^{**}</math>
Farmer	21	14.8	1	1.7		
Worker	9	6.3	32	55.2		
Businessman	44	31.0	10	17.2		
Student	7	4.9	5	8.6		
Marital status						
Single	28	19.7	13	22.4	0.53	0.768
Married	111	78.2	43	74.1		
divorced/widow	3	2.1	2	3.4		
The educational level						
Does not read or write	15	10.6	0	0.0	79.08	<math>< 0.001^{**}</math>
Reads and writes	33	23.2	1	1.7		
Basic education	84	59.2	20	34.5		
Secondary education	2	1.4	4	6.9		
University education and more	8	5.6	33	56.9		
The state of residence of caregivers						
Lives together with the patient	117	82.4	57	98.3	9.18	0.002**
Lives separately from the patient	25	17.6	1	1.7		
The relationship between the caregiver and the elderly						
First degree	81	57.0	44	75.9	6.57	0.037*
Second degree	59	41.5	14	24.1		
Other #	2	1.4	0	0.0		

Chi square test for qualitative data between the two groups
 ** Significant level at P value < 0.01

*Significant level at P value < 0.05,
 # Third or fourth degree

Table (7): Relationship between studied elderly caregivers' level of practice toward pressure ulcer and demographic data, (N=200).

Demographic data of elderly caregivers	Caregivers' Practice about Pressure Ulcer				X2	P. value
	Inadequate (n=155)		Adequate (n=45)			
	No	%	No	%		
Age caregivers						
Less than 25 year	33	21.3	4	8.9	9.20	0.010*
From 25-35 year	89	57.4	37	82.2		
More than 35 year	33	21.3	4	8.9		
Place of residence						
Urban	67	43.2	28	62.2	5.05	0.025*
Rural	88	56.8	17	37.8		
Gender						
Male	83	53.5	19	42.2	1.79	0.181
Female	72	46.5	26	57.8		
Employment status						
Housewife	68	43.9	3	6.7	110.09	<0.001**
Farmer	22	14.2	0	0.0		
Worker	7	4.5	34	75.6		
Businessman	48	31.0	6	13.3		
Student	10	6.5	2	4.4		
Social status						
Single	32	20.6	9	20.0	0.90	0.637
Married	120	77.4	34	75.6		
divorced/widow	3	1.9	2	4.4		
The educational level						
Does not read or write	15	9.7	0	0.0	79.58	<0.001**
Reads and writes	34	21.9	0	0.0		
Basic education	90	58.1	14	31.1		
Secondary education	5	3.2	1	2.2		
University education and more	11	7.1	30	66.7		
The state of residence of caregivers						
Lives together with the patient	130	83.9	44	97.8	5.96	0.015*
Lives separately from the patient	25	16.1	1	2.2		
Relationship of the caregiver & elderly						
First degree	93	60.0	32	71.1	2.19	0.334
Second degree	60	38.7	13	28.9		
Other	2	1.3	0	0.0		

Chi square test for qualitative data between the two groups

** Significant level at P value < 0.01

*Significant level at P value < 0.05,

Third or fourth degree

Table (1): Shows that of the elderly patients studied, 49.5% were between the ages of 60 and 70, and 37.0% were between the ages of 70 and 80, with a mean ± SD(range) of 71.35±6.59(60-88). In terms of gender, it was found that 42.5% of the elderly study participants were female and 57.5% of them were male. Reads and writes was found to be the heights educational level of the studied elderly patients which represents 37.5%, while elderly who don't read and write represent 29.0%. Regarding for relative living with elderly, this table shows that (61.5%) of them were sons of elderly, while partner (wife or husband) were represents (37.5%).

Figure (1): This figure displays that the vast majority 93.5% of the studied elderly patients had pressure ulcer while 6.5% of them had not.

Figure (2): This figure shows symptoms of pressure ulcer that the elderly patients had. It is revealed that the most common symptoms are redness, insensitivity, and pain which represent (73.5%-

43.0%-41.0%) respectively, while the least common symptoms was gangrene (6.5%).

Figure (3): This figure displays that 72.5% and 60.5% of the studied elderly patients reported pressure ulcer in back and heel respectively. While 0.5% and 1.0% the studied elderly patients reported pressure ulcer in back of head and shoulder respectively.

Table (2): Represents that 63.0% of the studied elderly caregivers aged from 25 – 35 years, with Mean ± SD (range) = 30.50±2.26. Regarding the employment status of elderly caregivers, the housewife represents 35.5% of all participants, while the farmer represents 11.0%. Additionally this table shows that mostly lives with the elderly patient which represents 87.0% of the studied elderly caregivers.

Table (3): Explains the distribution of level of knowledge about pressure ulcers, it was observed that 76.5% and 83.5% of the studied elderly caregivers' answer was partially Correct, The define pressure

ulcers and when to seek medical attention respectively, while 39.5% and 35.5% of the studied elderly caregivers' answer was don't know, The stages of pressure ulcer and complications of pressure ulcer respectively.

Table (4): It was noticed that 37.5% of the studied elderly caregiver believed that a bedridden patient should be dragged slowly for changing the position, as incorrect statement. Also, 36.5% of them believed that massage is recommended for reddened body areas in bed ridden patients as incorrect statement. While 71.5% and 69.0% see that it is partially incorrect to turn or reposition patients in bed at least every 2 hours, and repositioning is not necessary to be performed on a bed ridden patient when a special mattress is applied respectively.

Figure (4): It displays that 71.0% of the studied elderly caregivers in this study had unsatisfactory knowledge about pressure ulcers, and 29.0% of them had satisfactory knowledge level.

Table (5): Represents that 41.5% of the studied elderly caregivers was incorrectly encourage and assist the patient to eat well, drink sufficient fluid, and exercise several times daily, while 41.5% of them incorrectly encourage patient involvement in activities and 44.5% incorrectly consider wiping the patient skin sites by using a towel without rubbing the skin. Additionally this table also revealed that 67.0% of the studied elderly caregivers partially correctly clean the skin immediately after toileting, while 70.0% of them partially correctly use skin moisturizers daily on dry skin.

Figure (5): It displays that 77.5% of the studied elderly caregivers in this study had inadequate practice toward pressure ulcers, while 22.5% of them had adequate practice toward pressure ulcers.

Figure (6): This figure illustrates a positive correlation ($r= 0.565$) and highly significant difference ($p. value = <0.001$) between the studied elderly caregivers' knowledge and practice toward pressure ulcer.

Table (6): This table reveals that there were highly statistical significant difference between the studied elderly caregivers' level of knowledge toward pressure ulcers with demographic data such as employment status, the educational level and the state of residence of caregivers with $p. value (<0.001^{**}, <0.001^{**}$ and 0.002^{**}) respectively.

Table (7): This table reveals that there was highly statistical significant difference between the studied elderly caregivers' level of practice of pressure ulcer with demographic data such as employment status and the educational level with $p. value <0.001^{**}$ and $<0.001^{**}$ respectively. Additionally this table illustrates that there was statistical significant difference in age caregivers, place of residence and

the state of residence of caregivers with $p. value (0.010^*, 0.025^*$ and $0.015^*)$ respectively.

Discussion:

Elderly people were at higher risk for developing pressure ulcer due to conditions related to the aging process and clinical conditions that involve reduced mobility. A major public health concern, pressure ulcers can cause psychological and physical problems that have an impact on morbidity and mortality. Owing to the negative effects of physical activity on health, long-term care facilities need to strategically plan to identify best practices for their caregivers in order to implement efficient PU prevention measures. Since caregivers assist in performing tasks like personal care, feeding, repositioning, skin hydration, and other inherent care activities, the adoption of PU-related preventive measures emphasized the importance of caregiver knowledge, attitudes, and practices (Matos et al., 2023).

The current study's findings regarding the age range of the elderly subjects under investigation indicated that they ranged from 60 to 88 years of age. It was observed that about half of elderly in age range 60–70 and the mean score of age was 71.35 ± 6.59 . The researcher point of view that high prevalence of pressure ulcer was among elderly people. These results are in agreement with Razi-Chafi et al., 2023 who studied prevalence of pressure ulcer and its related factors in elderly patients hospitalized to teaching hospitals in East Guilan. Found that the patients' mean age was determined to be 69.54 ± 9.33 years.

Also, agreed with Corbett et al., 2017 who studied Pressure injury in a community population in New England. Revealed that approximately 72.7 percent of the older adults in the study who were living at home and had a PU at the time of admission were among the patients with this condition. Additionally, another study in the United States of Bogaisky et al., 2015 which studied early hospital readmission of nursing home residents and community-dwelling elderly adults discharged from the geriatrics service of an urban teaching hospital. Observed that PU was linked to a higher percentage of elderly people living at home and hospital readmissions. Furthermore, Ibrahim & Abd El-Maksoud., 2021 who studied training program for caregivers to prevent pressure ulcers among elderly residents at geriatric homes Helwan district. Founded that the elderly patients mean ages were 74.82 ± 7.71 .

As regard gender of the studied elderly, the results of the present study showed that more than half were male. These results were in agreement with Ibrahim & Abd El-Maksoud., 2021. Who found that more than half 54.3% of studied elderly patients were male.

Also, **Razi-Chafi et al., 2023** revealed that more than half 59.6% of the cases were male. On the other hand, the study of **Ramos et al., 2022** who studied burden of informal caregivers of patients with pressure ulcers in a primary care setting. Who found that more than two-third 64.8% of elderly was female.

Regarding educational status of the studied elderly, the results of the present study showed that more than one-third were read and write only, while less than one-third were not read and write. From the researcher point of view, this was may be due to Egyptian culture of elderly of non-educated people. This was confirmed with **Lee et al., 2022** who studied impact of pressure ulcer prevention knowledge and attitude on the care performance of long-term care facility care workers in south Korea. Revealed that over two thirds of the elderly people under study had only completed elementary school or less.

Concerning the relative living with elderly, it was found that over half of them were the elderly's sons, and over one-third were partners (wife or husband). From the researcher point of view, this was may be due to son was the first person was responsible for caring for his parents. This was in agreement with **Artico et al., 2018** who studied prevalence, incidence and associated factors of pressure ulcers in an Italian home palliative care patients, and found that the first, which included nearly two-thirds of the cases, is configured as a patient/caregiver dyad, whereby there is a unique caregiver, usually the spouse and mainly female. Over two-thirds of the patients 65.9% had a lone caregiver in their home; these caregivers were mostly women 76.3% and spouses 56.8%.

Regarding the location of pressure ulcer, these results showed that almost three-quarter of the elderly patients had pressure ulcer in back followed by more than two-third of them had pressure ulcer in heel. From the perspective of the researcher, this could be because of most elderly patients were sitting and sleeping on back and to improve respiratory problems due to increase risk of chronic diseases in elderly.

These results are on the contrary with **Mayrovitz et al., 2023** who studied venous, arterial, and neuropathic leg ulcers with emphasis on the geriatric population. They found that neuropathic ulcers accounted for about two thirds of cases, with the majority occurring on the forefoot. Also, **Artico et al., 2018** who found that the sacrum/coccyx was the most often occurring anatomical site 72.9%. Furthermore, **Razi-Chafi et al., 2023** revealed that the most common sites of pressure ulcers were sacrum 29.22%, hip 26.62%, and heel 14.28%.

As regard age of the studied elderly caregiver sample, the current study showed that two-third of studied elderly caregivers aged from 25 – 35 years, with Mean \pm SD (range) = 30.50 \pm 2.26. The findings were

consistent with a study done by **Lee et al., 2022** who assessed caregivers' knowledge, attitude, and practice towards pressure injuries in Bangladesh, assessed that more than three-quarters of responders were between the ages of 18 and 27 years and between 28 and 37 years. On the other hand, **Farzan et al., 2023** who studied a systematic review of caregivers' knowledge and related factors towards pressure ulcer prevention who found that the average age of elderly caregivers was 40.5. Also, the findings of the current study were consistent with **Alhammedi, & Ogale, 2020** who studied effectiveness of home caregivers teaching program on prevention of pressure ulcer in bed ridden elderly patients in Ras Al Khaimah and Julphar Primary health Centers. They found that the more than half 55.56% of elderly caregivers in the age of 21 to 41.

Regarding to gender, the current study showed that slightly more than half of elderly caregivers were male. The findings of the current study were in contrast with **Sari et al., 2022** who studied development and psychometric evaluation of an instrument to assess knowledge, attitude and practice of family caregivers at preventing pressure injuries in Indonesian community-dwelling older adults. Who found that majority 89.0% of studied elderly caregivers was female.

In addition to **BaniHani et al., 2023** who studied knowledge and practice of informal caregivers on pressure injury prevention and treatment among patients need palliative care in Jordan. Founded that slightly less than three-quarter of elderly caregivers were female. Also, **Lee et al., 2022** found that slightly more than three-quarter of elderly caregivers were female. Also, these findings of the current study were consistent with **Alhammedi & Ogale., 2020** who found that the majority 91.0% of elderly caregivers were female. Furthermore, **Tharu et al., 2022** who studied caregivers' knowledge, attitude, and practice towards pressure injuries in spinal cord injury at rehabilitation center in Bangladesh. They found that more than three-quarter of elderly caregivers were female.

As regarding to employment status of elderly caregivers, the current study showed that more than one-third of the elderly caregivers were housewife. The researcher point of view, this could be attributed to the fact that they know a little bit about basic care but not much about positioning and transfer. PU care seemed less familiar to them than the different facets of general care. The findings of the current study were consistent with **Lee et al., 2022** who revealed that more than two-third of caregiver was housewives. Also, **Tharu et al., 2022** showed that nearly two-thirds of the caregivers were housewives.

Regarding to the studied elderly caregivers' marital status, the current study showed that more than three-quarter of the elderly caregivers were married. From the researcher point of view, this may be due to most of them had age of marriage from 26-35 years old. The current study's conclusions concurred with **Lee, et al., 2022** & **Tharu et al., 2022** showed that the majority 86.6% of elderly caregivers were married. In contrast, **BaniHani et al., 2023** who revealed that more than three-quarter of elderly caregivers were unmarried.

In relation to education level, the current study showed that more than half of elderly caregivers had basic education. This, from the researcher opinion, may be related to Arab customs that emphasize that family caregivers who are unmarried and unemployed should have a greater concern for their patients than do those who work long hours. The findings of the current study were in consistent with **Farzan et al., 2023** showed that less than half of elderly caregivers were under diploma. On the opposite side, **Lee et al., 2022** showed that more than one-third of elderly caregivers had informal education. Moreover, **Sari et al., 2022** who found that more than three-quarter of elderly caregivers had low education. Furthermore, **Tharu et al., 2022** who showed that more than one-third of elderly caregivers had no formal education.

According to the state of residence of caregivers, the current study showed that the majority of elderly caregivers lived with the patient. In my point of view this may be due to family caregivers who lived with the elderly were the first line of providing care to the patients lived. The findings of the current study were in consistent with **BaniHani et al., 2023** who revealed that more than three-quarter of elderly caregivers lived with elderly patients. Also, **Tharu et al., 2022** who revealed that more than three-quarter of the elderly caregivers lived in the same house with elderly patients.

Concerning to studied elderly caregivers total score of knowledge, the findings showed that less than three-quarter of the studied elderly caregivers had unsatisfactory with knowledge level. A possible reason for explaining this unsatisfactory level of knowledge of the studied elderly caregivers may be due to certain factors. Firstly, the elderly caregivers had basic education that may not able to acquire all information toward pressure ulcer prevention. Lack of current up-dated knowledge and information toward PU prevention. Also, they had lack of support from formal caregivers from hospitals and guidelines about care and prevention of pressure ulcers.

The findings of the current study were contracted with **Farzan et al., 2023** who revealed that the level of caregivers' knowledge of PU prevention is moderate. However, these findings vary. The

elements impacting caregivers' knowledge may be the cause of this variation. Also, **Tharu et al., 2022** who revealed that the caregiver's knowledge regarding prevention and care of PU was at a moderate level $M = 73.68\%$, $SD = 6.43$ with the majority of elderly caregivers had moderate level of knowledge. Moreover, the knowledge and socio demographic characteristics of elderly caregivers indicated a significant relationship with age, educational status, and caregiver-patient relationship.

Regarding to elderly caregivers total score of practice, the current study showed that more than three-quarter of elderly caregivers had inadequate practice level. A possible reason for explaining this inadequate level of practice of the studied elderly caregivers may be due to certain factors. Firstly, the elderly caregivers had basic education, were housewife and married, so they have heavy workload this may be factors that make the stressed up thus, making them have poor attitude to practice of prevention toward pressure ulcer despite their basic knowledge. Another factor may be the lack of equipments and resources material that used to prevent pressure ulcers such as air mattress and wheel chair.

The findings of the current study were in contrary with **Lee et al., 2022** who revealed that the caregiver's practice regarding prevention and care of PU was determined to be at a moderate level. In this study, caregivers' practice was reflected by their knowledge. Vast majority of PU was preventable with the knowledge of their risk factors. Also, **Tharu et al., 2022** who revealed that the caregiver's practice regarding prevention and care of PU was at a moderate level $M = 74.77\%$, $SD = 9.08$. It was found that nearly half of the elderly caregivers scored moderate knowledge level.

Regarding to the relation between elderly caregivers knowledge and practice, the current study showed that there was a positive correlation and highly significant between the studied elderly caregivers knowledge and practice toward pressure ulcer. In my point of view this may be due to elderly caregivers practice depended on the level of knowledge. For example, if the elderly caregiver's knowledge level was unsatisfactory, the practice level will be inadequate too. This was in the same line with **Lee et al., 2022** who revealed that the pressure-ulcer-prevention-related care performance was found to have a significant and positive correlation with pressure-ulcer-prevention-related knowledge $r = 0.692$, $p < .001$.

According the relation between the studied elderly caregivers knowledge and demographic data, it was observed that there were statistical significance difference between elderly caregivers knowledge level and (employment status, the educational level

and the state of residence of caregivers and the relationship between the caregiver and the elderly). This finding was supported by **Farzan et al., 2023** who showed that occupation, level of education, and inpatient wards had a significant relationship with caregivers' knowledge regarding PUs prevention. Also, **Tharu et al., 2022** who showed that the percentage of caregivers fell as educational attainment increased. This made it abundantly evident that the knowledgeable caregivers had no interest in fulfilling the role of caregiver. It was discovered that the majority of the caregivers were housewives in terms of occupation, and that there was a strong correlation between their age and educational attainment.

Additionally to **BaniHani et al., 2023** who revealed that the education level was not associated with informal caregivers' knowledge of PU prevention and treatment, while education for informal caregivers has an important role in clinically improving patient status. Furthermore, **Lee et al., 2022** who showed that it was predicted that if the patient was married, the wife and mother would be the primary caregivers, with other family members rarely involved. On the other hand **Farzan et al., 2023** revealed that one factor influencing the caregivers' degree of PU prevention knowledge was their marital status.

Besides to the elderly caregivers' level of knowledge of repositioning to prevent pressure ulcer, this study showed that the two-third of the elderly caregivers had partially incorrect, so the vast majority of elderly patient had pressure ulcer. These results are in agreement with **Mäki-Turja-Rostedt et al., 2019** who studied preventive interventions for pressure ulcers in long-term older people care facilities in Turkey. According to their report, a study revealed that repositioning every three hours during the night with a 30 degree tilt (left side, back, right side, and back) and offloading the heels from the bed significantly decreased the incidence of pressure ulcers.

Concerning the relation between the studied elderly caregivers practice and demographic data, it was noticed that there were statistical significance difference between elderly caregivers practice level and (age, place of residence, employment status, the educational level and the state of residence of caregivers). This finding was supported by **Tharu et al., 2022** who found that the gender, educational level, and caregiver-patient relationship were significantly impacted by the elderly caregivers' practice.

According to **Lee et al., 2022** regarding PU prevention and care, there was a statistically significant and positive correlation between the knowledge and practice of caregivers. Practice level

was significantly correlated with gender. Given that the majority of caregivers were found to be housewives, it is likely that women participate in household chores, which accounts for this moderate level of practice across genders. A moderate level of practice is correlated with one's educational status. Research indicates that caregivers with higher educational attainment also exhibit higher levels of practice. Age, gender, marital status, skin relationships, and practice level all showed a similarly strong correlation. In a similar vein, caregivers' educational backgrounds had an impact on the standard of care.

On the other hand, **Razi-Chafi et al., 2023**, the study's findings demonstrated a significant correlation $P\text{-value} \leq 0.05$ between age and the prevalence of pressure ulcers in elderly hospital patients, with an increase in pressure ulcer prevalence with advancing age. Nevertheless, there was no discernible link found between gender and the incidence of pressure ulcers. Furthermore, it was demonstrated that the length of hospital stay and the prevalence of pressure ulcers in elderly patients were significantly correlated.

Conclusion:

Based on the findings of the current study, it could be concluded that:

The studied elderly caregivers had 71.0% of unsatisfactory level of knowledge toward pressure ulcer. In addition, the studied elderly caregivers had 77.5% inadequate practice level toward pressure ulcer. Also, illustrated a positive correlation $r = 0.565$ and highly significant difference $p\text{ value} = <0.001$ between the studied elderly caregivers' knowledge and practice toward pressure ulcer.

Recommendation:

In the light of the study finding, the investigator is recommended that:

- Training program should be done for elderly caregiver to enhance knowledge and practice toward pressure ulcer.
- Establish educational program about pressure ulcers for elderly caregivers to increase competency.
- Further research can be conducted on larger sample involving control and experimental groups of caregivers including regular evaluation to assess the care provided to the bedridden elderly patients at home.

Reference:

- **Artico, M., Dante, A., D'Angelo, D., Lamarca, L., Mastroianni, C., Petitti, T., & De Marinis, M., (2018):** Prevalence, incidence and associated factors of pressure ulcers in home palliative care patients:

- A retrospective chart review. Palliative medicine, Vol. (32), No. (1), Pp. 299-307.
- **Alhammedi, H., & Ogale, R., (2020):** Effectiveness of home caregivers teaching program on prevention of decubitus ulcer in bed ridden elderly patients. International Journal of Nursing, Vol. (7), No. (2), Pp. 67-69.
 - **Amini, M., Mansouri, F., Vafae, K., Janbakhsh, A., Mahdavian, S., Moradi, Y., & Fallahi, M., (2022):** Factors affecting the incidence and prevalence of pressure ulcers in COVID-19 patients admitted with a Braden scale below 14 in the intensive care unit: Retrospective cohort study. International Wound Journal. Vol. (19), No. (8), Pp. 2039-2054.
 - **Antony, L., & Thelly, A., (2022):** knowledge on prevention of pressure ulcers among caregivers of patients receiving home-based palliative care. Indian Journal of Palliative Care, Vol. (28), No. (1), Pp. 75.
 - **Awad, W., & Hewi, S., (2020):** Effect of pressure ulcer preventive nursing interventions on knowledge, attitudes and practices of nurses among hospitalized geriatric patients in Alexandria, Egypt. J Nurs Health Sci, Vol. (9), No. (2), Pp. 1-12.
 - **BaniHani, H., Alnaeem, M., Saleh, M., & Nashwan, A., (2023):** knowledge and practice of Informal Caregivers on Pressure Injury Prevention and Treatment among Patients Need Palliative Care: A Cross-Sectional Study. Unpublished thesis of Institutional Review Board at the School of Nursing at the University of Jordan. Available at Research Square [https://doi.org/10.21203/rs.3.rs-2481207/v1].
 - **Bogaitsky M, & Dezieck L., (2015):** Early Hospital Readmission of Nursing Home Residents and Community-Dwelling Elderly Adults Discharged from the Geriatrics Service of an Urban Teaching Hospital: Patterns and Risk Factors. J Am Geriatric Soc.; Vol. (63), No. (3), Pp. 548–52.
 - **Boyko T, Longaker M, & Yang G., (2018):** Review of the Current Management of Pressure sores .Journal of Advanced Wound Care (New Rochelle). Vol. (7), No. (2).Pp. 57–67.
 - **Cai, Y., Song W., Li and Jing, Ying and Liang, Chuqian and Zhang, Liyuan and Zhang, Xia and Zhang, Wenhui and Liu, Beibei and An, Yongpan and Li, Jingyi & Tang, Baixue and Pei., (2022):** the landscape of aging. Science China Life Sciences. Vol. (65), No. (12).Pp. 2354-2454.
 - **Corbett LQ, Funk M, Fortunato G, & O’Sullivan DM., (2017):** Pressure injury in a community population: a descriptive study. J Wound Ostomy Continence Nurs.; Vol. (44), No. (3), Pp. 221–7.
 - **Farzan, R., Yarali, M., Mollaei, A., Ghaderi, A., Takasi, P., Sarafi, M., & Karkhah, S., (2023):** A systematic review of caregivers' knowledge and related factors towards pressure ulcer prevention. International Wound Journal. Vol. (20), No. (8), Pp. 3362–3370.
 - **Fathia A. Mersal., (2014):** Caregivers' knowledge and practice regarding prevention of immobilization complications in El-demerdash Hospital Cairo Egypt. American Journal of Research Communication, Vol. (2), No. (3).P.P: 78-98. www.usa-journals.com, ISSN: 2325-4076.
 - **Fletcher J, & Hall J; (2018):** New guidance on how to define and measure pressure sores. Nursing Times. Vol. (114), No. (10).Pp. 41-44.
 - **Ibrahiem, D., & Abd El-Maksoud, M., (2021):** Training program for caregivers to prevent pressure ulcers among elderly residents at geriatric homes. Frontiers of Nursing, Vol. (8), No. (3), Pp. 249-259.
 - **Indriati, E., & Nugroho, N., (2022):** Philosophy of Law and The Development of Law as A normative Legal Science. International Journal of Educational Research and Social Sciences (IJERSC), Vol. (3), No. (1), Pp. 314-321.
 - **Källman, U., Hommel, A., Borgstedt Risberg, M., Gunning berg, L., Sving, E., & Bååth, C., (2022):** Pressure ulcer prevalence and prevention interventions–A ten-year nationwide survey in Sweden. International wound journal. Vol. (19), No. (7), Pp. 1736-1747.
 - **Lee, S. B., & Lee, H. Y., (2022):** Impact of pressure ulcer prevention knowledge and attitude on the care performance of long-term care facility care workers: a cross-sectional multicenter study. BMC geriatrics, Vol. (22), No. (1), Pp. 1-12.
 - **Matos, S., Souza, A., Abreu, M., Gomes, A., Oliveira, J., Silva, M., & Oliveira, S., (2023):** Pressure injury prevention in older people: construction and validation of an instrument for caregivers. Revista Brasileira de Enfermagem, Vol. (76), No. (1).
 - **Mäki-Turja-Rostedt, S., Stolt, M., Leino-Kilpi, H., & Haavisto, E., (2019):** Preventive interventions for pressure ulcers in long-term older people care facilities: A systematic review. Journal of clinical nursing, Vol. (28), No. (13-14), Pp. 2420-2442.
 - **Mayrovitz, H., Wong, S., & Mancuso, C., (2023):** Venous, Arterial, and Neuropathic Leg Ulcers With Emphasis on the Geriatric Population. Cureus, Vol. (15), No. (4).
 - **Mir, M., Kumar, P., Maurya, R., Jain, J., Pal, S., & Kumari, B., (2023):** Pressure Ulcers: Risk Factors, Prevention and Surgical Management. New

Advances in Medicine and Medical Science. Vol. (2), Pp. 131-144.

- **Mohiuddin, A. (2019):** Skin aging & modern age anti-aging strategies. Pharma Tutor, Vol. (7), No. (8), Pp. 22-70.
- **Moore, Z., Avsar, P., O'ConNo.r, T., Budri, A., Bader, D. L., Worsley, P., & Patton, D., (2023):** A systematic review of movement monitoring devices to aid the prediction of pressure ulcers in at-risk adults. International Wound Journal, Vol. (20), No. (2), Pp. 579-608.
- **Parisod, H., Holopainen, A., Koivunen, M., Puukka, P., & Haavisto, E., (2022):** Factors determining nurses' knowledge of evidence-based pressure ulcer prevention practices in Finland: a correlational cross-sectional study. Scandinavian Journal of Caring Sciences, Vol. (36), No. (1).P.P: 150-161.
- **Ramos, P., Borges, C., Azevedo, I., Almeida, P., Soares, A., Alves, P., & Magalhães, A., (2022):** Burden of informal caregivers of patients with pressure ulcers in a primary care setting. Journal of Wound Care, Vol. (31), No. (10), Pp. 864-871.
- **Razi-Chafi, Z., Esmailpour-Bandboni, M., & Salmalian, Z., (2023):** Prevalence of pressure ulcer and its related factors in elderly patients hospitalized to teaching hospitals in East Guilan. Journal of Current Oncology and Medical Sciences, Vol. (3), No. (1), Pp. 375-381.
- **Rêgo, A., Furtado, G., Bernardes, R., Santos-Costa, P., Dias, R., Alves, F., & Salgueiro-Oliveira, A., (2023):** Development of smart clothing to prevent pressure injuries in bedridden persons and/or with severely impaired mobility: 4No.Pressure research protocol. In Healthcare (Vol. (11), No. (10), Pp. 1361). MDPI.
- **Sari, S., Everink, I., Lohrmann, C., Amir, Y., Sari, E., Halfens, R., & Schols, J., (2022):** Development and psychometric evaluation of an instrument to assess knowledge, Attitude and Practice of Family Caregivers at Preventing Pressure Injuries (KAP-PI) in Indonesian community-dwelling older adults. BMC nursing, Vol. (21), No. (1), Pp. 222.
- **Sultana, M., Ehsan, N., Zaman, L., Pinto, J., Shahidur Rahman, A., & Ahsan, M., (2022):** Home-Health-Aides Role in Preventing Pressure Ulcers of the Older Adults: A Scoping Literature Review. Archives of Clinical and Biomedical Research, Vol. (6), No. (1), Pp. 74-84.
- **Tharu, N., Alam, M., Bajracharya, S., Chaudhary, G., Pandey, J., & Kabir, M., (2022):** Caregivers' knowledge, attitude, and practice towards pressure injuries in spinal cord injury at

rehabilitation center in Bangladesh. Advances in Orthopedics. Vol. (2022), Pp. (9).

- **Zhong, Y., Wang, J., & Nicholas, S., (2020):** Social support and depressive symptoms among family caregivers of older people with disabilities in four provinces of urban China: the mediating role of caregiver burden. BMC geriatrics, Vol. (20), No. (1), Pp. 1-10.

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