

Effect of an educational program on a family caregiver's prevention and management of pressure ulcers in bedridden patients after discharge from hospitals in Palestine

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Abstract

Background: Pressure ulcer affects approximately 9% of all hospitalized patients and 23% of all nursing home patients, thereby posing to be a serious problem. However, prompt and effective treatment can minimize these dangerous effects and speed recovery.

Objective: To determine the effectiveness of an educational program on a family caregiver's prevention and management of pressure ulcers of bedridden patients after discharge from El-Wafa Medical Rehabilitation Hospital, Gaza Strip, Palestine.

Materials and Methods: Preexperimental, prospective, with pretest and posttest, design was followed. The study recruited a convenient sample of 80 caregivers of the bedridden patients who were admitted to El-Wafa Medical Rehabilitation Hospital. Pretest questionnaire was administered for the eligible subjects. The educational training package was delivered in three sessions within 1 week. Posttest questionnaire was filled after 3 weeks to assess the effectiveness.

Results: About 58.8% of the caregivers were women and 53.8% aged younger than 30 years. The performance of the caregivers has significantly improved after the program in most of the items ($P < 0.05$). Scores of subscales: wound care and dressing, proper nutrition, maintaining personal hygiene, incontinence training and knowledge about ulcers were all significantly higher after training ($P < 0.05$). The difference between the total domains after the program ($M = 3.47$) was significantly higher than the total domains before the program ($M = 3.30$; t test 4.87; $P = 0.00$).

Conclusion: The study revealed a high effectiveness of this educational-training program in managing and preventing pressure ulcers for bedridden patients by caregivers at their homes. Application of this preventive program should be extended to cover all rehabilitative and governmental hospitals in Palestine to reduce the burden of pressure ulcers on the families and the health-care system.

KEY WORDS: Pressure ulcer, educational program, prevention, caregivers, bedridden patients

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Introduction

Pressure ulcer affects approximately 9% of all hospitalized patients and 23% of all nursing home patients, thereby posing to be a serious problem. It is difficult-to-treat condition, mostly resulting in pain, disfigurement, and prolonged hospitalization. However, prompt and effective treatment can minimize these dangerous effects and aid speed recovery.^[1] Pressure ulcer is

a significant problem because it occurs in every health-care setting such as hospitals, nursing homes, and hospice and even at homes.^[2,3]

In the United States, pressure ulcers are a common condition, affecting an estimated 3 million adults. Estimates of pressure ulcer prevalence reach to 38% in acute care hospitals. Approximately 60,000 patients succumb to this condition as a direct result each year.^[4,5] Pressure ulcers poses great economic burden. In the United States, pressure ulcer care is estimated to approach \$11 billion (USD) annually, with a cost of between \$20,900 and 151,700 (USD) per pressure ulcer.^[6] The development of pressure ulcers is relatively common. A review of epidemiological studies in Europe described the reported prevalence as ranging from 8.3% to 23%. In the United Kingdom, the overall prevalence rate of this condition in care settings was 10.2%, with 59% of these being acquired from hospital setting.^[7] Information from the Agency for Healthcare Research and Quality indicates that pressure ulcer-related hospitalizations have increased to an alarming rate of 80% from 2006 to 2014.^[8] The pain, treatments, and increased length of institutional stay caused by pressure ulcers reduces the quality of life considerably, and it may also result in premature death in some patients. Hence, preventing pressure ulcers or treating them once they start with appropriate intervention to reduce the cost of care and improve the quality of life of affected individuals makes that intervention to be important.^[9]

Statistics in Palestine indicates high prevalence of pressure ulcers among inactive patients. Recently, about 2,312 cases were registered in Gaza Strip compared with 4,033 cases in West Bank. The mortality is high from complications such as gangrene, osteomyelitis, fractures, sepsis, and other localized or systemic infections.^[10] Moreover, it affects biopsychosocial status and has high expensive cost. Therefore, pressure ulcer is considered a major health problem in Palestine, which needs an urgent action to prevent, control, and treat. To reduce all of these burdens, there is a need for preparing an educational package to increase the knowledge and awareness of family caregivers who care for bedridden patients after discharge from hospitals in Palestine. This study is considered the first step in this long road. Initiating an educational program in Gaza Strip is now a top priority to increase awareness of patients and their families about prevention, control, and treatment of pressure ulcer. Therefore, the aim of this study was to initiate and examine the effectiveness of an educational program on a family caregiver's prevention and management of pressure ulcers of bedridden patients after discharge from El-Wafa Medical Rehabilitation Hospital, Gaza Strip, Palestine.

Materials and Methods

Preexperimental, prospective, with pretest and posttest, design was followed. The study population was all caregivers of the bedridden patients who were admitted to El-Wafa Medical Rehabilitation Hospital for at least 2 weeks and still

in the hospital during the study period. The inclusion criteria were as follows:

1. Diagnosed by a physician as bedridden patient.
2. Was admitted to medical rehabilitation hospital for at least 2 weeks.
3. Was hospitalized during the study period in El-Wafa Hospital.
4. Needs a caregiver partially or completely.

The study recruited a convenient sample of 80 caregivers of the bedridden (at high risk for pressure ulcer) patients who were admitted to El-Wafa Medical Rehabilitation Hospital and stayed at least 3 weeks in the hospital. After obtaining the permissions to conduct the study, the researchers met the eligible participants and carefully explained the purpose and the method of the study. When the subjects agreed to participate in the study, they were assured that they could withdraw at any time.

The Questionnaire Design and Content

After reviewing the literature and consulting with experts in this field, the educational and training program was developed by the authors. It was composed of three sections:

1. Demographic data of the patients' caregivers;
2. Disease profile of the bedridden patients; and
3. Educational and training instructions on how to prevent assess and treat pressure ulcers.

These instructions were divided into five domains: knowledge about prevention and management of pressure ulcers; wound care and dressing; proper nutrition; maintaining personal hygiene; and incontinence training. All answers on the paragraphs were based on the 5-item Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Pilot Study

The data collection package (the demographic information sheet and the other parts of questionnaire) was pilot tested by 20 eligible caregivers. The goals for this pilot testing were to assess the adequacy of the data collection plan, to know whether respondents understand the questions in the same way, to identify any parts of the instrument that the subjects find objectionable or culturally incongruent, and to determine needs for further training of the data collection staff. Considerable revisions and refinements have been introduced to the instruments; thus, all of the pilot participants were excluded from the study. Validity and reliability were done for the tool. The correlation coefficients value was equal to 0.79 and Cronbach's coefficient alpha was 0.82, which was considered high.

Data Collection Procedure

Pretest questionnaire was administered for the eligible subjects shortly after admission to the hospital. Then, the educational training package was delivered in three sessions within 1 week during hospitalization. Finally, posttest

questionnaire was filled after 3 weeks at caregivers' homes to assess the effectiveness.

Statistical Analysis

SPSS, version 18, was used for statistical analysis. Frequencies and percentile were used for descriptive purposes. Paired-sample *t* test was conducted to compare the differences between pre- and posttest achievements.

Results

Demographic Data of the Patients' Caregivers

Table 1 indicates that 53.8% of the caregivers were younger than 30 years, 26.2% were aged 30–40 years, and 20% were older than 40 years. About 41.3% were men and 58.7% women. About 20% live in the southern governorates; 13.7% from the middle zone; and 66.3% in the north. From the sample, 36.3% were married, 56.2% single, 1.3% widowed, and 6.2% were divorced. About 37.5% of the caregivers had university education, and 30.0% of them were poor with monthly income less than 300 USD. By asking

Table 1: Demographic data of the patients' caregivers

| Item | Frequency | Percent |
|---------------------|-----------|---------|
| Gender | | |
| Male | 33 | 41.3 |
| Female | 47 | 58.7 |
| Age | | |
| Less than 30 years | 43 | 53.8 |
| 30–40 years | 21 | 26.2 |
| More than 40 years | 16 | 20 |
| Marital status | | |
| Married | 29 | 36.3 |
| Single | 45 | 56.2 |
| Widowed | 1 | 1.3 |
| Divorced | 5 | 6.2 |
| Address | | |
| South | 16 | 20 |
| Middle zone | 11 | 13.7 |
| North | 53 | 66.3 |
| Qualifications | | |
| Elementary | 9 | 11.3 |
| Preparatory | 16 | 20 |
| Secondary | 25 | 31.2 |
| University or above | 30 | 37.5 |
| Monthly income | | |
| Less than 300 USD | 24 | 30 |
| 300–500 USD | 30 | 37.5 |
| More than 500 USD | 26 | 32.5 |
| Household members | | |
| 1–5 members | 21 | 26.2 |
| 6–10 members | 36 | 45 |
| 11–15 members | 18 | 22.5 |
| 16 members or more | 5 | 6.3 |

about the household members, 26.2% of the caregivers had 1–5 household members, 45% had 6–10 members, 22.5% had 11–15 members, and 6.3% from the sample had 16 members or more.

Pressure Ulcer Profile of the Bedridden Patients

Table 2 shows that the symptoms of bed ulcers of 27.5% of the patients showed pus discharge, 30.0% were black spots, 25.0% emitted bad smell, and 17.5% had no clear answer. About 27.5% considered the signs of pressure ulcers healing to be small size of ulcer, 37.5% absence of discharges and pus, 11.3% black scar, and 23.7% growth of granulation tissues. The duration of pressure ulcers for 46.3% of the patients was 1 day, 38.8% was 1 month, 8.7% was 1 year, and 6.2% was more than 1 year. The sites of pressure ulcers of 8.4% of patients were located on the occipital area, 4.2% over the scapulas, 8.9% in the low back, 19.3% over the hips (right and left), 8.8% over the knees, 34.5% in the waist sides

Table 2: Pressure ulcer profile of the bedridden patients

| Item | Frequency | Percent |
|---------------------------------|---------------|---------|
| Signs of pressure ulcers | | |
| Pus discharge | 22 | 27.5 |
| Black spot | 24 | 30 |
| Bad smell | 20 | 25 |
| I do not know | 14 | 17.5 |
| Signs of pressure ulcer healing | | |
| Smaller size of ulcer | 22 | 27.5 |
| Absence of discharges and pus | 30 | 37.5 |
| Black scar | 9 | 11.3 |
| Growth of granulation tissues | 19 | 23.7 |
| Duration of pressure ulcer | | |
| Day | 37 | 46.3 |
| Month | 31 | 38.8 |
| Year | 7 | 8.7 |
| More | 5 | 6.2 |
| Area of pressure ulcers | No. of ulcers | |
| Occipital | 20 | 8.4 |
| Scapulas | 10 | 4.2 |
| Low back | 21 | 8.9 |
| Hips (right and left) | 46 | 19.3 |
| Knees | 21 | 8.8 |
| Waist sides (right and left) | 82 | 34.5 |
| Heels area | 23 | 9.6 |
| Sides of heels | 15 | 6.3 |
| Total | 238 | 100 |
| Presence of muscle spasm | | |
| Yes | 38 | 47.5 |
| No | 42 | 52.5 |
| Location of muscle spasm | | |
| Right upper limb | 22 | 23.7 |
| Right lower limb | 28 | 30.1 |
| Left upper limb | 18 | 19.3 |
| Right lower limb | 25 | 26.9 |
| Total | 93 | 100 |

(right and left), 9.6% on the heels area, and 6.3% in the sides of heels. Regarding the presence of muscle spasm, about 47.5% of the patients had muscle spasm while 52.5% did not. The location of muscle spasm for 23.7% of the patients was at right upper limb, 30.1% right lower limb, 19.3% left upper limb, and 26.9% right lower limb.

Effect of Training Program on the Caregivers' Performance

Research hypothesis was "the performance scores of the caregivers after the exposure to the educational and training program will be significantly higher than the performance before the program." To test the hypothesis, a

paired-sample *t* test was done to estimate the differences in each paragraph of the training program and the performance of caregivers before and after exposure to the educational and training package [Table 3]. Table 3 shows that the performance of the caregivers has significantly improved after the program in most of the items. Table 4 also illustrates that the mean of each domain after the program was higher than the mean before the program. Moreover, the difference between the total domains after the program ($M = 3.47$) was significantly higher than the total domains before the program ($M = 3.30$) (t test = -4.87; $P = 0.00$).

Table 3: Paired-samples *t* test for differences in caregivers' performance before and after the educational program

| No. | Paragraph | Before | | After | | <i>t</i> test | <i>P</i> value |
|-----|---|----------|-----------|----------|-----------|---------------|----------------|
| | | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> | | |
| 1 | Pressure ulcers are redness in the skin | 343 | 123 | 268 | 043 | -565 | 0.000* |
| 2 | The ulcer is a black scar | 293 | 125 | 334 | 120 | -212 | 0.035* |
| 3 | I know the causes of ulcers | 364 | 113 | 424 | 057 | -420 | 0.000* |
| 4 | I know spots where ulcers may occur | 341 | 108 | 399 | 077 | -385 | 0.000* |
| 5 | I know ulcers occur over bony prominences | 328 | 107 | 408 | 079 | -531 | 0.000* |
| 6 | I know air mattress prevents ulcers | 364 | 110 | 409 | 107 | -261 | 0.010* |
| 7 | I have a good knowledge of rolling a patient in bed | 411 | 057 | 413 | 075 | -011 | 0.906** |
| 8 | Bed ulcers are critical for patient's health | 411 | 077 | 434 | 047 | -220 | 0.029* |
| 9 | Bed ulcers hinder active daily living | 400 | 079 | 430 | 046 | -291 | 0.004* |
| 10 | Bed ulcers may need surgical intervention to be healed | 341 | 114 | 401 | 089 | -369 | 0.000* |
| 11 | I know bed ulcers could be treated at home | 313 | 108 | 393 | 085 | -518 | 0.000* |
| 12 | I think that ulcers take long time to be fully recovered | 390 | 082 | 419 | 057 | -256 | 0.011* |
| 13 | I check ulcer spots every 2 h | 349 | 114 | 429 | 091 | -487 | 0.000* |
| 14 | I change dressing every day | 234 | 117 | 301 | 135 | -337 | 0.001* |
| 15 | The patient has air mattress in order to prevent ulcers | 295 | 137 | 281 | 138 | 062 | 0.530** |
| 16 | The patient helps on easing pressure on back while sitting on wheel chair | 286 | 136 | 281 | 125 | 024 | 0.810** |
| 17 | I clean patient's body everyday | 426 | 063 | 441 | 056 | -158 | 0.116** |
| 18 | I do skin care regularly | 130 | 077 | 175 | 066 | -395 | 0.000* |
| 19 | The patient has control over urination | 268 | 125 | 220 | 122 | 242 | 0.016* |
| 20 | Diapers are changed on regular basis | 403 | 094 | 441 | 054 | -318 | 0.002* |
| 21 | The patient is fed orally | 389 | 100 | 366 | 123 | 126 | 0.208** |
| 22 | Food quality is good | 415 | 061 | 448 | 050 | -364 | 0.000* |
| 23 | The food contains meat, veggies, fruits, and corns | 428 | 061 | 441 | 063 | -131 | 0.190** |
| 24 | Patient receives 2 L of water a day | 386 | 088 | 430 | 080 | -329 | 0.001* |

*Significant at $\alpha = 0.05$.

**Not significant.

Table 4: Effect of training program on each domain and total domains

| No. | Domain | Before | | After | | Total <i>t</i> test and <i>P</i> value |
|-----|--|--------|-----------|-------|-----------|--|
| | | Mean | <i>SD</i> | Mean | <i>SD</i> | |
| 1 | Knowledge about prevention and management of pressure ulcers | 334 | 065 | 358 | 0876 | t test = -487; P value = 0.000* |
| 2 | Wound care and dressing | 312 | 032 | 323 | 0586 | |
| 3 | Maintaining personal hygiene | 331 | 145 | 343 | 1748 | |
| 4 | Incontinence training | 333 | 078 | 364 | 1245 | |
| 5 | Proper nutrition | 343 | 079 | 349 | 0950 | |
| | Total | 330 | 030 | 347 | 021 | |

*Significant at $\alpha = 0.05$.

Discussion

This study examined the effectiveness of family training on prevention of pressure ulcer among bedridden patients after discharge from El-Wafa medical rehabilitation hospital in Gaza strip.

Demographic Data of the Patients' Caregivers

Most of the caregivers were younger than 30 years. This young age facilitated the understanding and the easy application of the educational program, which improved the management and prevention of pressure ulcers. As long as the caregivers are young, this may help in changing, turning, and caring for the bedridden patients. With respect to the gender, most of the participants were women. This was better for the application of the program because the females were closer to the patients and more compliant to follow the instructions of the educational program. The majority of the caregivers were single, widowed, or divorced. These people were more committed to the application of the program as they have more time. Regarding educational background, the majority was university graduates, and their capacity to learn and apply the instructions of the program was high. This facilitated the efficiency of educational program administration and application.

Pressure Ulcer Profile of the Bedridden Patients

Signs of Pressure Ulcers

Most of the signs reported were black spot, pus discharge, and bad smell. The presence of these signs indicated neglect and delaying in caring for ulcers. This reflects the need for education and training to increase awareness and the knowledge of patients' caregivers.

The pressure ulcer can be a mild pink coloration of the skin that vanishes within a few hours if pressure is relieved on the area but ranges to a very deep wound that extends to and sometimes via internal organs and into bone. The course of injury of the pressure ulcers mimics that of a burn wound. The mild redness of the skin and/or blistering resembles a first-degree burn, ranging to a deep open wound with a lot of blackened tissue that is similar to a third- or fourth-degree burn.

Signs of Healing

The signs of healing reported were smaller size of ulcer, absence of discharges and pus, black scar, and growth of granulation tissues. These results are in accordance with a study that reported similar signs of healing.^[11]

Duration of Pressure Ulcers

This study indicated that the duration of the pressure ulcers ranged from 1 day to more than 1 year. However, the majority of ulcers last about 1 month. Many factors influence the duration of bedsores. Healing can vary anywhere from 1 to 6 weeks, or from 6 weeks to 3 months, but often longer. It depends on the health conditions of the patients. Stage II to IV ulcers may take longer than 6 months.

Location of Pressure Ulcers

Most of pressure ulcers were located on the waist sides, low back, hips, heels, knees, scapulas, and occiput. These results are congruent with other studies^[12,13] that reported that 95% of pressure ulcers occur on the lower part of the body. The hip and buttock regions account for 67% of all pressure sores, with sacral locations being most common. The lower extremities account for an additional 25% of all pressure sores, with malleolar, heel, patellar, and pretibial locations being most common. The remaining 10% or so of pressure sores may occur in any location that experiences long periods of uninterrupted pressure. Nose, chin, forehead, occiput, chest, back, and elbow are among the more common of the infrequent sites for pressure ulceration.^[14]

Presence and Location of Spasticity

About half of the patients experienced muscle spasm mainly in lower limbs. This is similar to a report,^[15] which indicated that contractures and spasticity often contribute by repeatedly exposing tissues to pressure through flexion of a joint. Contractures rigidly hold a joint in flexion, while spasticity subjects tissues to considerable repeated friction and shear forces so that pressure sore can develop.

Effect of Training Program on the Caregivers' Performance

Testing the hypothesis using a paired-sample *t* test indicated that the caregivers' performance after receiving the educational and training program was significantly better than that before the program. These results were confirmed by many researches worldwide, which highlight the importance and the significance of this study.

Young *et al.* conducted a recent study to describe the effect of Medline Pressure Ulcer Prevention Program. They found a significant reduction in the mean monthly hospital-acquired pressure ulcer rate when preprogram was compared with postprogram.^[16] Tetterton *et al.*^[17] evaluated the effectiveness of delivering high-quality, easily accessible geriatric education and training program for direct care providers and other practitioners to prevent and treat pressure ulcers. Evaluation of the program revealed a significant reduction in the incidence of pressure ulcers from 1996 to 2000. Garber *et al.*^[18] in their study indicated that enhanced, individualized education about pressure ulcer prevention and management was effective in improving pressure ulcer knowledge during hospitalization for surgical repair of a pressure ulcer. Wurster^[19] found that pressure ulcer prevention and management is beneficial not only to patients but also to the health system; so, education for health-care professionals is an important factor in the prevention and management of pressure ulcers. Romanelli^[20] emphasized that education of nurses, patients, and their relatives is vital in prevention of pressure damage.^[20]

In a randomized clinical trial conducted by Moya and Morison,^[21] a home-based educational intervention was effective in reducing the incidence and the risk of pressure ulcer in adults with progressive neurological conditions. Farrell and Dempsey^[22] indicated that written prevention

protocols for education of patients, family, and health-care personnel are crucial to reduce or eliminate factors contributing to the development of pressure ulcer. The study of Wilson and Williams^[23] approved the benefit of the patients' educational materials such as pamphlets and brochures to teach patients about the prevention and care of skin and pressure ulcers in urban hospitals, home-care agencies, and public clinics in the Midwest in the United Kingdom. Bours *et al.*^[24] recommended use of guidelines for prevention and treatment of pressure ulcers as importance of changing position every 2 h, well-balanced nutrition, use of support surfaces, and effective implementation of these guides to prevent pressure ulcers.

Rosen *et al.*^[25] conducted a study to know if educating nursing home staff about pressure ulcer prevention reduces the differential risk of pressure ulcer development in black and white nursing home residents. The study concluded that "the education intervention effectively reduced the rate of pressure ulcers for all residents and eliminated the racial disparity noted during the baseline period."

Conclusion

The study approved the highly effectiveness of this educational-training package in managing and preventing pressure ulcers for bedridden patients by caregivers at their homes. Application of this preventive program should be extended to cover all rehabilitative and governmental hospitals in Palestine to reduce the burden of pressure ulcers on the families and the health-care system.

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