RESULTS

The results obtained from this study will be classified and presented in the following four parts:

Part I: The general characteristics of the studied children (Table 1).

Part II: Frequency distribution of the studied groups regarding the application of routine nursing care (Table2).

Part III: Comparison between the studied groups regarding the effect of distraction techniques on:

- Vital signs (Table 3, 4, 5, 6, 7, 8)

- Children's behavioral pain response (Table 9, 10, 11)

Part IV: Comparison between the studied groups regarding the effect of distraction techniques on physiologic and behavioral pain response in relation to age, sex, and birth order (Table 12, 13, 14).

Part I: **The General Characteristics of the Studied Children**

Table (1) shows the biosocial characteristics of the studied children. The mean values of children ages were 3.95, 4.60, and 3.97 for group (I), (II), and (III) respectively.

Males were found to have the highest percentage among the three groups as they represented 85.7%, 60%, and 85.7% for group (I), (II), and (III) respectively.

The highest percentage of group (I), (II), and (III) were diagnosed as inguinal hernia which represented 37.1%, 31.4%, and 25.7% respectively. Then, in group I, the undescended testis came at the second order representing 20% followed by the umbilical hernia which represented 17.1 %. While, Hirschsprung disease represented 5.7% as the same as the intestinal obstruction. Furthermore, intussusception, colostomy, Wilm's tumor, colon by pass, and urinary diversion represented the same as each other 2.9%.

In group (II), undescended testis also came in the second order representing 22.9% followed by umbilical hernia which represented 20%. Moreover, colostomy, gastrostomy, and colon by pass have represented 5.7% for each one of them. While Hirschsprung disease, Wilm's tumor, and urinary diversion represented the same as each other 2.9%.

Furthermore, in group (III), umbilical hernia came in the second stage representing 22.9% followed by undescended testis which represented 20%. While, hirschsprung disease, colostomy, gastrostomy, colon by pass, and intestinal perforation represented 8.6%, 2.9%, 5.7%, 11.4%, and 2.9% respectively.

Moreover, it can be seen that the first child represented the highest percentage of children's birth order in the three groups representing 48.6%, 51.4%, and 62.9% in group (I), (II), and (III) respectively. The second child represented 28.6%, 14.3%, and 25.7% in group (I), (II), and (III) respectively. Also the third child represented 14.3%, 20%, and 11.4% in group (I), (II), and (III) respectively.

In addition, this table shows that there was no statistically significant difference found between the experimental and control groups regarding type of operation and birth order. On the other hand, a statistically significant difference was found between the experimental and control groups regarding age and gender.

Part II: Frequency distribution of the studied groups regarding the application of routine nursing care.

Table (2) shows the frequency distribution of the studied groups regarding the application of the routine nursing care to them. Children in the whole studied sample (100%) have received analgesics and they also have their mothers admitted with them throughout the hospital stay. On the other hand, the two experimental groups (100%) did not receive any method of distraction before conducting the study.

Table (2): Frequency Distribution of the Studied Groups Regarding the Application of the Routine Nursing Care.

The Routine Nursing Care	Group I n= 35		Group II n= 35		Group III n= 35	
	No.	%	No.	%	No.	%
Prescribed medications:						
- Administered	35	100.0	35	100.0	35	100.0
- Not administered	0	0.0	0	0.0	0	0.0
Playing:						
Done	0	0.0	0	0.0	0	0.0
Not done	35	100.0	35	100.0	35	100.0
Listening to short stories:						
Done	0	0.0	0	0.0	0	0.0
Not done	35	100.0	35	100.0	35	100.0
Parental involvement:						
Done	35	100.0	35	100.0	35	100.0
Not done	0	0.0	0	0.0	0	0.0

Group 1: playing with mechanical toy

Group II: listening to short stories

Group III: control group

Part III: The effect of distraction techniques on:

I) Vital Signs:

- ***Body temperature***

Table (3) shows the mean differences between values of body temperature of the studied groups before and after the application of distraction techniques.

On the first day, the mean value of body temperature in group (I) was 37.58 ± 0.46 ^{o}c in the morning shift and 37.40 ± 0.48 ^{o}c in the evening shift, then after playing with a mechanical toy for 20 minutes it decreased to reach 37.43 ± 0.56 ^{o}c and 37.16 ± 0.51 ^{o}c at the morning and evening shifts respectively. A statistically significant difference was found only between values of body temperature after playing with a mechanical toy in the first day evening shift (t test = 8.007).

In group (II), the mean value of body temperature was 37.66 ± 0.55 ^{o}c at the morning shift and 37.64 ± 0.49 ^{o}c at the evening shift, then after listening to short stories for 20 minutes it changed to become 37.67 ± 0.57^{o}c and 37.57 ± 0.47 ^{o}c at the morning and evening shifts respectively. No statistically significant difference was found between values of body temperature after listening to short stories in both morning and evening shifts.

In group (III), the mean value of body temperature was 37.55 ± 0.43^{o}c at the morning shift and 37.55 ± 0.53 ^{o}c at the evening shift, and then it changed to become 37.56 ± 0.41 ^{o}c and 37.54 ± 0.53 ^{o}c after the application of the routine nursing care. No statistically significant difference was found between values of body temperature in both

morning and evening shifts after the application of the routine nursing care.

On the second day, the mean value of body temperature in group (I) was 37.52 ± 0.56 ^{o}c at the morning shift and 37.44 ± 0.42 ^{o}c at the evening shift then it decreased to become 37.34 ± 0.48 ^{o}c and 37.26 ± 0.41 ^{o}c after playing with a mechanical toy for 20 minutes. A statistically significant difference was found between the mean values of body temperature in both morning and evening shifts after playing with a mechanical toy (t test = 3.960 in the morning and 4.223 in the evening).

In group (II), the mean value of body temperature was 37.39 ± 0.45 ^{o}c and 37.32 ± 0.51 ^{o}c at the morning and evening shifts respectively then it changed to become 37.26 ± 0.42 ^{o}c and 37.12 ± 0.40 ^{o}c after listening to short stories for 20 minutes. A statistically significant difference was found between the mean values of body temperature in both morning and evening shifts after listening to short stories (t test = 2.683 in the morning and 3.069 in the evening).

In group (III), the mean value of body temperature was 37.41 ± 0.63 ^{o}c and 37.37 ± 0.56 ^{o}c at the morning and evening shifts respectively then it changed to become 37.35 ± 0.5 ^{o}c 3 and 37.37 ± 0.56 ^{o}c after receiving the routine nursing care. No statistically significant difference was found between values of body temperature in both morning and evening shifts after the application of the routine nursing care.

On the third day, the mean value of body temperature in group (I) was 37.18 ± 0.31 ^{o}c at the morning shift and 37.13 ± 0.33 ^{o}c at the evening shift then it varied to become 36.96 ± 0.29 ^{o}c and 36.89 ± 0.27 ^{o}c after playing with a mechanical toy for 20 minutes. A statistically significant

difference was found between the mean values of body temperature in both morning and evening shifts after playing with a mechanical toy (t test = 7.529 in the morning and 8.263 in the evening).

In group (II), the mean value of body temperature was 37.12 ± 0.42 ^{o}c and 37.12 ± 0.37 ^{o}c at the morning and evening shifts respectively then it changed to become 37.05 ± 0.44 ^{o}c and 37.01 ± 0.37 ^{o}c after 20 minutes of listening to short stories. A statistically significant difference was found only between values of body temperature at the evening shift after listening to short stories (t test= 2.646).

In group (III), the mean value of body temperature was 37.26 ± 0.42^{o}c and 37.22 ± 0.37 ^{o}c at the morning and evening shifts respectively then it changed to become 37.24 ± 0.36 ^{o}c and 37.23 ± 0.32 ^{o}c after receiving the routine nursing care. No statistically significant difference was found between values of body temperature in both morning and evening shifts after the application of the routine nursing care.

Table (4) shows the comparison of mean scores of values of body temperature for the studied groups after the application of different distraction techniques.

On the first day morning, no statistically significant difference was found between the mean values of body temperature after applying the two distraction techniques neither when compared with the control group nor when compared with each other. While at the evening shift, a statistically significant difference was found between the mean values of body temperature after applying the two distraction techniques when compared with the control group and when compared with each other (f test = 6.810).

On the second day morning, no statistically significant difference was found between the mean values of body temperature after applying the two distraction techniques when compared with the control group or when compared with each other. While at the evening shift, a statistically significant difference was found between the mean values of body temperature after applying the two distraction techniques when compared with the control group. No statistically significant difference was found between the mean values of body temperature after applying the two distraction techniques when compared with each other.

On the third day, a statistically significant difference was found between the mean values of body temperature in both morning and evening shifts after applying the two distraction techniques when compared with the control group (f test= 5.064 in the morning and 9.347 in the evening). No statistically significant difference was found between the mean values of body temperature in both morning and evening shifts

after applying the two distraction techniques when compared with each other.

- *Heart rate*

Table (5) shows the mean differences between heart rates of the studied groups before and after the application of distraction techniques.

On the first day, the mean value of heart rate in group (I) was 116.54±14.41 beat/minute in the morning shift and 117.71±13.74 beat/minute in the evening shift, then after playing with a mechanical toy for 20 minutes it decreased to reach 113.83±13.51 beat/minute and 111.43±12.95 beat/minute at the morning and evening shifts respectively. A statistically significant difference was found only between values of heart rate after playing with a mechanical toy in the 1st day evening shift (t test = 6.220).

In group (II), the mean value of heart rate was 123.26±19.56 beat/minute at the morning shift and 120.06±19.13 beat/minute at the evening shift, then after listening to short stories for 20 minutes it changed to become 123±18.62 beat/minute and 113.94±15.20 beat/minute at the morning and evening shifts respectively. A statistically significant difference was found between values of heart rate only at the first day evening shift after listening to short stories (t test= 3.333).

In group (III), the mean value of heart rate was 124.20±15.18 beat/minute at the morning shift and 125.17±13.44 beat/minute at the evening shift, and then it changed to become 125.60±16.60 beat/minute and 124.77±13.53 beat/minute after the application of the routine nursing care. No statistically significant difference was found between values of heart rate in both morning and evening shifts after the application of the routine nursing care.

On the second day, the mean value of heart rate in group (I) was 116.46$\pm$13.31 beat/minute at the morning shift and 115.51$\pm$16.24 beat/minute at the evening shift then it decreased to become 114.63$\pm$13.39 beat/minute and 110.91$\pm$14.87 beat/minute after playing with a mechanical toy for 20 minutes. A statistically significant difference was found between the mean values of heart rate in the evening shift only after playing with a mechanical toy (t test = 3.837).

In group (II), the mean value of heart rate was 113.74$\pm$16.73 beat/minute and 112.14$\pm$15.81 beat/minute at the morning and evening shifts respectively then it changed to become 110.09$\pm$16.21 beat/minute and 109.46$\pm$15.98 beat/minute after listening to short stories for 20 minutes. A statistically significant difference was found between the mean values of heart rate in both morning and evening shifts after listening to short stories (t test = 4.080 in the morning and 2.802 in the evening).

In group (III), the mean value of heart rate was 126.17$\pm$12.19 beat/minute and 124.57$\pm$12.06 beat/minute at the morning and evening shifts respectively then it changed to become 124.14$\pm$14.62 beat/minute and 126.46$\pm$14.34 beat/minute after receiving the routine nursing care. No statistically significant difference was found between values of heart rate in both morning and evening shifts after the application of the routine nursing care.

On the third day, the mean value of heart rate in group (I) was 112.69$\pm$14.97 beat/minute at the morning shift and 111$\pm$12.56 beat/minute at the evening shift then it varied to become 106.71$\pm$14.56 beat/minute and 103.20$\pm$10.78 beat/minute after playing with a mechanical toy for 20 minutes. A statistically significant difference was

found between the mean values of heart rate in both morning and evening shifts after playing with a mechanical toy (t test = 4.578 in the morning and 13.911 in the evening).

In group (II), the mean value of heart rate was 111.83+13.44 beat/minute and 110.49+13.53 beat/minute at the morning and evening shifts respectively then it changed to become 108.97+14.40 beat/minute and 106.37+13.82 beat/minute after 20 minutes of listening to short stories. A statistically significant difference was found between the mean values of heart rate in both morning and evening shifts after listening to short stories (t test = 3.913 in the morning and 4.824 in the evening).

In group III, the mean value of heart rate was 122.60+13.89 beat/minute and 124.23+11.23 beat/minute at the morning and evening shifts respectively then it changed to become 123.54+13.67 beat/minute and 124.20+13.86 beat/minute after receiving the routine nursing care. No statistically significant difference was found between values of heart rate in both morning and evening shifts after the application of the routine nursing care.

Table (6) shows the comparison of mean scores of values of heart rates for the studied groups after the application of different distraction techniques.

On the first day morning, a statistically significant difference was found between the mean values of heart rate after applying the two distraction techniques when compared with the control group and when compared with each other (f test= 4.987). While at the evening shift, a statistically significant difference was found between the mean values of heart rate after applying the two distraction techniques when compared with the control group (f test= 9.072). No statistically significant difference was found between the mean values of heart rate after applying the two distraction techniques when compared with each other.

On the second day, a statistically significant difference was found between the mean values of heart rate in both morning and evening shifts after applying the two distraction techniques when compared with the control group (f test = 8.235 in the morning and 13.661 in the evening). No statistically significant difference was found between the mean values of heart rate in both morning and evening shifts after applying the two distraction techniques when compared with each other.

On the third day, a statistically significant difference was found between the mean values of heart rate in both morning and evening shifts after applying the two distraction techniques when compared with the control group (f test = 14.444 in the morning and 25.757 in the evening). No statistically significant difference was found between the mean values of heart rate in both morning and evening shifts after applying the two distraction techniques when compared with each other.

- ***Respiratory rate***

Table (7) shows the mean differences between respiratory rates of the studied groups before and after the application of distraction techniques.

On the first day, the mean value of respiratory rate in group (I) was 30.30 ± 7.25 cycle/minute in the morning shift and 29.43 ± 5.62 cycle/minute in the evening shift, then after playing with a mechanical toy for 20 minutes it decreased to reach 29.23 ± 6.21 cycle/minute and 26.80 ± 5.62 cycle/minute at the morning and evening shifts respectively. A statistically significant difference was found only between values of respiratory rate after playing with a mechanical toy in the first day evening shift (t test = 7.399).

In group (II), the mean value of respiratory rate was 27.60 ± 4.21 cycle/minute at the morning shift and 27.03 ± 5.06 cycle/minute at the evening shift, then after listening to short stories for 20 minutes it changed to become 27.31 ± 3.97 cycle/minute and 26.40 ± 5.15 cycle/minute at the morning and evening shifts respectively. No statistically significant difference was found between values of respiratory rate in both morning and evening shifts after listening to short stories.

In group (III), the mean value of respiratory rate was 30.23 ± 5.42 cycle/minute at the morning shift and 30.54 ± 6.17 cycle/minute at the evening shift, and then it changed to become 30.17 ± 6.42 cycle/minute and 31 ± 7.88 cycle/minute after the application of the routine nursing care. No statistically significant difference was found between values of respiratory rate in both morning and evening shifts after the application of the routine nursing care.

On the second day, the mean value of respiratory rate in group (I) was 28.69 ± 5.69 cycle/minute at the morning shift and 27.46 ± 7.28 cycle/minute at the evening shift then it decreased to become 26.09 ± 5.64 cycle/minute and 25.54 ± 6.99 cycle/minute after playing with a mechanical toy for 20 minutes. A statistically significant difference was found between the mean values of respiratory rate in the morning and evening shifts after playing with a mechanical toy (t test $=6.154$ in the morning and 4.549 in the evening).

In group (II), the mean value of respiratory rate was 26.49 ± 4.61 cycle/minute and 27.14 ± 3.36 cycle/minute at the morning and evening shifts respectively then it changed to become 26.54 ± 4.80 cycle/minute and 25.89 ± 4.80 cycle/minute after listening to short stories for 20 minutes. A statistically significant difference was found between the mean values of respiratory rate in the evening shift after listening to short stories (t test $= 2.246$).

In group (III), the mean value of respiratory rate was 29.31 ± 6.75 cycle/minute and 29.49 ± 6.88 cycle/minute at the morning and evening shifts respectively then it changed to become 28.57 ± 6.44 cycle/minute and 29.97 ± 7.98 cycle/minute after receiving the routine nursing care. A statistically significant difference was found between values of respiratory rate only at the morning shift after the application of the routine nursing care (t test$= 2.034$).

On the third day, the mean value of respiratory rate in group (I) was 27.89 ± 6.67 cycle/minute at the morning shift and 26.26 ± 5.23 cycle/minute at the evening shift then it varied to become 25.29 ± 6.03 cycle/minute and 23.34 ± 4.89 cycle/minute after playing with a mechanical toy for 20 minutes. A statistically significant difference was

found between the mean values of respiratory rate in both morning and evening shifts after playing with a mechanical toy (t test = 5.883 in the morning and 8.299 in the evening).

In group (II), the mean value of respiratory rate was 26.29±3.83 cycle/minute and 25.40±4.76 cycle/minute at the morning and evening shifts respectively then it changed to become 24.23±4.44 cycle/minute and 23.40±4.30 cycle/minute after 20 minutes of listening to short stories. A statistically significant difference was found between the mean values of respiratory rate in both morning and evening shifts after listening to short stories (t test = 3.295 in the morning and 4.673 in the evening).

In group (III), the mean value of respiratory rate was 28.11±5.08 cycle/minute and 28.26±4.87 cycle/minute at the morning and evening shifts respectively then it changed to become 27.89±5.10 cycle/minute and 27.89±4.71 cycle/minute after receiving the routine nursing care. No statistically significant difference was found between values of respiratory rate in both morning and evening shifts after the application of the routine nursing care.

Table (8) shows the comparison of mean scores of values of respiratory rates for the studied groups after the application of different distraction techniques.

On the first day morning and evening shifts, a statistically significant difference was found between the mean values of respiratory rate after applying the two distraction techniques when compared with the control group (f test = 2.325 in the morning and 5.665 in the evening). No statistically significant difference was found between the mean values of respiratory rate after applying the two distraction techniques when compared with each other.

On the second day morning, no statistically significant difference was found between the mean values of respiratory rate after applying the two distraction techniques when compared with the control group or when compared with each other. While at the evening shift, a statistically significant difference was found between the mean values of respiratory rate after applying the two distraction techniques when compared with the control group (f test= 4.696). No statistically significant difference was found between the mean values of respiratory rate after applying the two distraction techniques when compared with each other.

On the third day, a statistically significant difference was found between the mean values of respiratory rate in both morning and evening shifts after applying the two distraction techniques when compared with the control group (f test= 4.524 in the morning and 11.025 in the evening). No statistically significant difference was found between the mean values of respiratory rate in both morning and evening shifts after applying the two distraction techniques when compared with each other.

II) Children's Behavioral Pain Response:

Table (9) shows the differences between children's behavioral pain scoring among the studied groups before and after applying different distraction techniques according to Children's Hospital of Eastern Ontario Pain Scale at the three morning shifts.

On the first day morning, 2.9% of group (I) who had minimum pain changed to become 28.6% after playing with a mechanical toy for 20 minutes, while 62.9% of them who suffered from moderate pain decreased to become 45.7% after 20 minutes of playing with a mechanical toy. Furthermore, 34.3% of them who had severe pain decreased to reach 17.1% after playing with a mechanical toy for 20 minutes. A statistically significant difference was found between children's behavioral pain scoring after playing with a mechanical toy (t= 6.853).

In group (II), nearly three quarters of them (71.4%) who scored moderate pain decreased to become 65.7% after listening to short stories for 20 minutes. While, 28.6% of them who suffered from severe pain changed to become 20% after 20 minutes of listening to short stories. A statistically significant difference was found between children's behavioral pain scoring after listening to short stories (t= 5.026).

Moreover, in group (III) 5.7%, 65.7%, and 28.6% of them who scored minimum, moderate, and severe pain respectively changed after receiving routine nursing care to become 20%, 57.1%, and 22.9%. No statistically significant difference was found between children's behavioral pain scoring after the application of the routine nursing care.

On the second day morning, 8.6% of group (I) who had minimum pain became 65.7% after 20 minutes of playing with a mechanical toy. However, 88.55 of them who suffered from moderate pain changed to 22.9% after 20 minutes, while 2.9% of them who felt severe pain remained the same after playing with a mechanical toy. A statistically significant difference was found between children's behavioral pain scoring after playing with a mechanical toy (t= 8.535).

Furthermore, by listening to short stories, 28.6% and 71.4% of group (II) who scored minimum and moderate pain respectively changed to become 65.7% and 25.7% after 20 minutes. A statistically significant difference was found between children's behavioral pain scoring after listening to short stories (t= 7.250).

Moreover, by applying the routine nursing care, 45.7% of group (III) who suffered from minimum pain varied to become 51.4%, while 45.7% of them who felt moderate pain decreased to reach 42.9% after receiving the routine nursing care. In addition, 8.6% of them who suffered from severe pain decreased to become 2.9% after nursing care. No statistically significant difference was found between children's behavioral pain scoring after the application of the routine nursing care.

On the third day morning, in group (I), more than half of them (51.4%) who felt minimum pain became 74.3% after playing with a mechanical toy for 20 minutes. While, 40% of them who had moderate pain changed to become14.3% after 20 minutes. In addition, 8.6% of them who suffered from severe pain changed to no pain after 20 minutes. A statistically significant difference was found between children's behavioral pain scoring after playing with a mechanical toy (t= 11.764).

By listening to short stories, 68.6% of group (II) who had minimum pain decreased after 20 minutes to reach 65.7%. Whereas, 31.4% of them who scored moderate pain changed to become 11.4% after 20 minutes. A statistically significant difference was found between children's behavioral pain scoring after listening to short stories (t= 8.000).

Furthermore, before the application of the routine nursing care, 2.9%, 48.6%, 45.7%, and 2.9% of group (III) who had no pain, minimum pain, moderate pain, and severe pain respectively changed after the application of the routine nursing care to become 14.3%, 48.6%, 31.4%, and 5.7%. No statistically significant difference was found between children's behavioral pain scoring after the application of the routine nursing care.

Table (10) shows the differences between children's behavioral pain scoring among the studied groups before and after applying different distraction techniques according to Children's Hospital of Eastern Ontario Pain Scale at the three evening shifts.

On the first day evening shift, 14.3%, 77.1%, and8.6% of group (I) who scored pain as minimum, moderate, and severe respectively changed to become 54.3%, 37.1%, and 5.7% after playing with a mechanical toy for 20 minutes. A statistically significant difference was found between children's behavioral pain scoring after playing with a mechanical toy (t= 7.809).

In group (II), by listening to short stories, 8.6% and 91.4% of them who scored minimum and moderate pain respectively changed to become 57.1% and 40% after 20 minutes. A statistically significant difference was found between children's behavioral pain scoring after listening to short stories (t= 5.729).

Moreover, in group (III), 31.4%, 65.7%, 2.9% of them who scored pain as minimum, moderate, and severe pain respectively changed to become 20%, 74.3%, and 5.7% after receiving the routine nursing care. A negative statistically significant difference was found between children's behavioral pain scoring after the application of the routine nursing care (t= -2.109).

On the second day evening shift, by playing with a mechanical toy, 11.4% and 82.9% of group (I) who felt minimum and moderate pain respectively varied to become 68.6 and 22.9% after 20 minutes. In addition, 5.7% of them who suffered from severe pain changed to no pain after 20 minutes. A statistically significant difference was found between

children's behavioral pain scoring after playing with a mechanical toy (t= 10.124).

In group (II), more than half of them (54.3%) who felt pain as minimum changed to become 80% after listening to short stories. Moreover, 42.9% of them who felt pain as moderate decreased to reach 5.7% after 20 minutes. Meanwhile, 2.9% of them who felt sever pain remained the same after 20 minutes. A statistically significant difference was found between children's behavioral pain scoring after listening to short stories (t= 5.201).

Furthermore, the majority of group (III) (60%) who had minimum pain and the minority of them (40%) who had moderate pain changed to become 40% and 51.4% respectively after applying the routine nursing care. No statistically significant difference was found between children's behavioral pain scoring after the application of the routine nursing care.

On the third day evening shift, 11.4% of group (I) who had no pain became 28.6% after playing with a mechanical toy. While, 65.7% of them whose score was minimum pain changed to become 68.5% after 20 minutes. In addition, 20% of them who scored moderate pain changed to no pain. Meanwhile, 2.9% of them who had severe pain remained the same after 20 minutes. A statistically significant difference was found between children's behavioral pain scoring after playing with a mechanical toy (t= 7.708).

By listening to short stories, 2.9% of group (II) who felt no pain increased to reach 37.1% after 20 minutes. Furthermore, 82.8% of them who scored pain as minimum changed to become 62.9%. Whereas, 14.3% of them who scored pain as moderate pain changed to no pain after 20 minutes. A statistically significant difference was found between

children's behavioral pain scoring after listening to short stories (t= 6.906).

Furthermore, by applying the routine nursing care, 2.9%, 54.3%, and 42.9% of group (III) who scored no pain, minimum pain, and moderate pain changed to become 14.3%, 42.9%, and 40% after receiving the routine nursing care. No statistically significant difference was found between children's behavioral pain scoring after the application of the routine nursing care.

Table (11) shows a comparison between children's behavioral pain scoring among the studied groups after applying different distraction techniques according to Children's Hospital of Eastern Ontario Pain Scale.

On the first day morning and evening shifts, a statistically significant difference was found between children's behavioral pain scoring after applying the two distraction techniques when compared with the control group (f =3.054 in the morning and 12.904 in the evening). No statistically significant difference was found between children's behavioral pain scoring after applying the two distraction techniques when compared with each other.

On the second day morning and evening shifts, a statistically significant difference was found between children's behavioral pain scoring after applying the two distraction techniques when compared with the control group (f =8.425 in the morning and 10.746 in the evening). No statistically significant difference was found between children's behavioral pain scoring after applying the two distraction techniques when compared with each other.

On the third day morning and evening shifts, a statistically significant difference was found between children's behavioral pain scoring after applying the two distraction techniques when compared with the control group (f =9.541 in the morning and 19.421 in the evening). No statistically significant difference was found between children's behavioral pain scoring after applying the two distraction techniques when compared with each other.

Part IV: Comparison between the studied groups regarding the effect of distraction techniques on pain response in relation to sex, age, and birth order.

Table (12) shows the effect of distraction techniques on physiological and behavioral pain response in relation to sex at the morning and evening shifts all over the three days.

In group (I), the mean value of body temperature was 37.24 ± 0.45^{o}c and 37.10 ± 0.44^{o}c in males and females respectively before playing with a mechanical toy. Then, it changed to become 37.21 ± 0.47^{o}c and 36.96 ± 0.43^{o}c after 20 minutes at the morning and evening shifts all over the three days. A statistically significant difference was found between values of body temperature after playing with mechanical toy in males and females at the morning and evening shifts all over the three days (t test= 11.507 in males and 4.480 in females).

In addition, the mean value of heart rates in group (I) was 113.42 ± 13.99 beat/minute in males and 124.37 ± 12.43 beat/minute in females before playing with a mechanical toy. Then, it decreased to reach 108.85 ± 13.35 beat/minute and 118.57 ± 13.61 beat/minute after 20 minutes at the morning and evening shifts all over the three days. A statistically significant difference was found between values of heart rates after playing with mechanical toy in males and females at the morning and evening shifts all over the three days (t test=8.587 in males and 4.488 in females).

Furthermore, the mean value of respiratory rates in group (I) was 28.49 ± 6.62 cycle/minute in males and 27.40 ± 4.91 cycle/minute in females then it changed to become 26.10 ± 6.23 cycle/minute and 25.73 ± 5.52 cycle/minute after 20 minutes of playing with a mechanical

toy at the morning and evening shifts all over the three days. A statistically significant difference was found between respiratory rates after playing with mechanical toy in males and females at the morning and evening shifts all over the three days (t test= 11.458 in males and 2.295 in females).

Moreover, the mean value of pain scoring in group (I) was 7.55+1.60 and 7.33+1.37 in males and females respectively before playing with a mechanical toy. Then, it changed to become 6.09+1.59 and 6.17+1.23 after 20 minutes at the morning and evening shifts all over the three days. A statistically significant difference was found between children's behavioral pain scoring after playing with mechanical toy in males and females at the morning and evening shifts all over the three days (t test= 18.824 in males and 7 in females).

In group (II), the mean value of body temperature was 37.40+0.44^{o}c in males and 37.34+0.61 ^{o}c in females before listening to short stories then it decreased to become 37.27+0.41 ^{o}c and 37.30+0.63 ^{o}c after 20 minutes at the morning and evening shifts all over the three days. A statistically significant difference was found between values of body temperature after listening to short stories only in males at the morning and evening shifts all over the three days (t test= 5.338).

Before listening to short stories, the mean value of heart rates in group (II) was 113.48+13.63 beat/minute in males and 117.90+20.90 beat/minute in females afterward it changed to reach 110.83+13.73 beat/minute and 113.69+19.93 beat/minute after 20 minutes of listening to short stories at the morning and evening shifts all over the three days. A statistically significant difference was found between values of heart rates after listening to short stories in males and females at the morning

and evening shifts all over the three days (t test= 4.721 in males and 4.876 in females).

The mean value of respiratory rates in group (II) was 26.32 ± 4.29 cycle/minute in males and 27.17 ± 4.42 cycle/minute in females before listening to short stories after that it decreased to become 25.11 ± 4.44 cycle/minute and 26.40 ± 5.09 cycle/minute after 20 minutes of listening to short stories at the morning and evening shifts all over the three days. A statistically significant difference was found between respiratory rates after listening to short stories in males and females at the morning and evening shifts all over the three days (t test= 3.308 in males and 2.074 in females).

Moreover, the mean value of pain scoring in group (II) was 6.94 ± 1.28 and 7.29 ± 1.36 in males and females respectively before listening to short stories. Then, it changed to become 5.79 ± 1.42 and 6.33 ± 1.48 after 20 minutes of listening to short stories at the morning and evening shifts all over the three days. A statistically significant difference was found between children's behavioral pain scoring after listening to short stories in males and females at the morning and evening shifts all over the three days (t test= 13.121 in males and 8.299 in females).

Meanwhile, the mean value of body temperature in group (III) was 37.36 ± 0.46^{o}c in males and $37.59 \pm 0.70\ ^{o}$c in females before receiving the routine nursing care then it decreased to become $37.35 \pm 0.43\ ^{o}$c and $37.57 \pm 0.65\ ^{o}$c after the routine nursing care at the morning and evening shifts all over the three days. No statistically significant difference was found between values of body temperature after receiving the routine nursing care in males and females at the morning and evening shifts all over the three days.

The mean value of heart rates in group (III) was 123.33 ± 13.12 beat/minute in males and 131.43 ± 9.42 beat/minute in females before the application of the routine nursing care then it varied to become 123.62 ± 14.62 beat/minute and 131.80 ± 10.05 beat/minute after receiving the routine nursing care at the morning and evening shifts all over the three days. No statistically significant difference was found between heart rates after receiving the routine nursing care in males and females at the morning and evening shifts all over the three days.

The mean value of respiratory rates in group (III) was 28.86 ± 5.01 cycle/minute in males and 32.10 ± 9.37 cycle/minute in females before the application of the routine nursing care then it varied to become 28.66 ± 5.46 cycle/minute and 32.80 ± 10.58 cycle/minute after receiving the routine nursing care at the morning and evening shifts all over the three days. No statistically significant difference was found between respiratory rates after receiving the routine nursing care in males and females at the morning and evening shifts all over the three days.

The mean value of pain scoring in group (III) was 7.18 ± 1.38 in males and 7 ± 0.91 in females before the application of the routine nursing care then it varied to become 7.22 ± 1.75 and 7.27 ± 1.20 after receiving the routine nursing care at the morning and evening shifts all over the three days. No statistically significant difference was found between respiratory rates after receiving the routine nursing care in males and females at the morning and evening shifts all over the three days.

Table (13) shows the effect of distraction techniques on physiological and behavioral pain response in relation to age at the morning and evening shifts all over the three days.

In group (I), before playing with a mechanical toy it was found that the mean value of body temperature, heart rate, respiratory rate, and behavioral pain response were negatively correlated with age which means that the older the child, the less the mean value of body temperature, heart rate, and respiratory rate. While after playing with a mechanical toy, only the mean value of body temperature was positively correlated with age. A statistically significant difference was found between the age of the children and the values of heart rates before and after playing with a mechanical toy at the morning and evening shifts allover the three days. Also a statistically significant difference was found between the age of the children and the values of respiratory rate after playing with a mechanical toy at the morning and evening shifts allover the three days.

In group (II), before listening to short stories, only respiratory rates were positively correlated with age. Then after listening to short stories for 20 minutes, the body temperature, heart rate, respiratory rate, and behavioral pain scoring became negatively correlated with age.

Furthermore, by applying the routine nursing care, the mean value of body temperature, heart rate, respiratory rate, and behavioral pain response were negatively correlated with age before and after receiving the routine nursing care. A statistically significant difference was found between the age of the children and the values of body temperature before receiving the routine nursing care r= -0.505. Also, a statistically significant difference was found between the age of the children and the

values of body temperature, heart rate, and behavioral pain response after receiving the routine nursing care (r= -0.515 for body temperature, -0.335 for heart rate, and -0.505 for behavioral pain response).

Table (14) shows the effect of distraction techniques on physiological and behavioral pain response in relation to birth order at the morning and evening shifts all over the three days.

In group (I), only the mean value of body temperature was positively correlated with birth order before and after playing with a mechanical toy at the morning and evening shifts allover the three days. A statistically significant difference was found between birth order and the mean value of body temperature after playing with a mechanical toy for 20 minutes at the morning and evening shifts allover the three days.

In group (II), only the mean value of respiratory rate was negatively correlated with birth order before and after listening to short stories at the morning and evening shifts allover the three days.

While, in group (III), only the mean value of respiratory rate was positively correlated with birth order before receiving the routine nursing care at the morning and evening shifts allover the three days. While after receiving the routine nursing care, only the mean value of heart rate was negatively correlated with birth order at the morning and evening shifts allover the three days.