PATIENT SAFETY RESTRAINT APPARATUS

For convenience of explanation, we shall explain as in the hospital environment, but the invention apparatus besides being used in the hospital environment, could also be used elsewhere such as nursing home or other institutions. Therefore the word "patient" used in this document could refer to an elderly person or just any person needing assistance such as from healthcare providers, to move around.

FIELD OF THE INVENTION

The invention relates to a patient safety restraint apparatus for use in the toilets of hospitals or nursing home environment.

The apparatus is used by nursing staff or healthcare providers to restraint a patient to their toilet seat and leave the patient alone to defecate. The apparatus purpose is to prevent the patient from getting up from the toilet seat on their own, without the presence of the nursing staff beside, thus preventing them from accidental falls.

The patient after defecating, would have to use the nurse call system in the hospital toilet, to call the nursing staff back, to help them get up, clean, dress and walk them back to their bed.

Applications of this apparatus need not be limited to hospital or nursing home environment.

BACKGROUND OF THE INVENTION

Currently in the hospitals, elderly or weak patients needing to defecate, would get the assistance of the nursing staff to help them walk to the toilet to defecate. However, the patient usually do not want the nursing staff to be standing beside them when they defecate. So, the nursing staff have to leave the patient alone to defecate. After defecating, the patient is supposed to use the nurse call system in the hospital toilets to call the nurse back to assist them to get up, clean, dress and walk them back to their bed.

However, in most cases, these patients do not heed this procedure as they believed they should be able to get up, clean and dress on their own. And in many of these instances, accidental falls occur.

Current available restraint devices are belt type, but these are not suitable in the hospital environment for restraining these patients. And these restraint methods also create much discomfort to the patient, besides many other problems to be listed below.

Therefore, there is now no such patient restraint apparatus existing, for use in hospital or nursing home environment to stop these accidental falls in the toilets.

Problem to be solved

What is required is to have a patient restraint apparatus in the toilet with the following criteria:

(i) easy for nursing staff or healthcare providers to use
(ii) does not create discomfort to the patient under restrained
(iii) allow patient to move their limbs and body easily, while under restrained

(iv) could accommodate patient of different sizes, such as fat or thin patient
(v) do not allow the patient to stand up on their own
(vi) do not allow the patient to release themselves from the restraint
(vii) only nurses or healthcare providers have the means to release the patient from the restraint

Our invention is to have a patient restraint apparatus that satisfy all the above criteria.

Nursing staff could assist to walk the elderly or weak patients to the toilet, and use the patient restraint apparatus on them. And the nursing staff could leave the patient alone to defecate. After the patient finished defecating, the patient could call the nursing staff via the hospital nurse call system to come back and release them from the restraint, and help them to stand up, clean,dress and walk back to their bed.

BRIEF SUMMARY OF INVENTION

First refer to figure 2 and then figure 1. Our invention is a patient safety restraint apparatus that comprises two side frames (101, 102) positioned on each side of a toilet bowl (107) , a front frame (103) where one end could slide along and could pivot on side frame (101), and the other end of the front frame (103) could be lowered to straddle onto the second side frame(102).

The apparatus further comprises a locking mechanism(104) that is attached to the second side frame (102). The moment when front frame (103) is lowered onto the second side frame(102), the locking mechanism (104) comprises means to automatically lock onto said front frame (103).

The locking mechanism (104) further comprises means to be unlocked by an electric signal.
The apparatus further comprises an electronic control box (105) which upon activation by an RFID card (106), could send an electric signal to unlock the locking mechanism (104). The electric signal from the electronic control box(105) travels to the locking mechanism(104) via wires that run within tube(109) and within side frame(102).

To use this invention apparatus, the nursing staff would lead the patient to be seated on the toilet seat. And in figure 3, the nursing staff would slide the front frame (103) stored at the rear, to the front of side frame (101), and lower the front frame(103), onto the second side frame (102). This would result in front frame(103) being automatically locked to the locking mechanism (104).
The patient would be seated and restrained to the space within the two side frames (101,102) and the front frame (103) as in figure 1. The nursing staff could leave the patient alone to defecate.

After defecating, the patient would call the nursing staff via the hospital nurse call system. In figure 1, the nursing staff could use an RFID card (106) to activate the electronic control box (105) to send an electric signal to unlock the locking mechanism (104). The nursing staff could release the patient, by lifting the front frame(103) up, and slide it along side frame (101), to be stored at the rear as in figure 3.

In another embodiment, the locking mechanism (104) could be implemented by means of an electromagnetic lock whereby the electric signal from the electronic control box is used to lock and unlock the electromagnetic lock in the locking mechanism.

BRIEF DESCRIPTION OF DRAWING

Figure 1 shows the patient safety restraint apparatus in the toilet, where the front frame (103) straddles the two side frames (101,102). In this position, the front frame (103) is locked by locking mechanism (104). During operation, the patient would be contained and restrained in the space within the two side frames (101,102) and the front frame (103).

Figure 2 shows the apparatus where the front frame (103) is lifted up. In this position, the front frame could slide to the rear of side frame (101), or the front frame(103) could be lowered to straddle onto the second side frame(102) to be locked by locking mechanism (104).

Figure 3 shows the apparatus where the front frame (103) is in the stored position at the rear of side frame (101). The front frame (103) is held in the stored position by holder (108).

Figure 3a shows the apparatus where push button switch(110) or remote control device(111) could be used to activate the electronic control box(105) to unlock the locking mechanism(104).

Figures 4, 4a ,4b, 4c, 4d, 4e are examples of possible side frame shape structure.

Figure 5a is one possible type of side frame that could swivel. It could be used for side frame (102) in figure 1, when toilet space is limited.

Figure 5b is the same as figure 5a when the side frame is swivelled to be stored in the vertical position.

Figure 6, 6a, 6b are examples of possible front frame shape structure.

Figure 7 shows how the locking mechanism (104) with electric lock, operates to lock onto the hook (103b) of front frame (103).

Figure 8a shows the diagram of the electric lock used in the locking mechanism.

Figure 8b shows the locking mechanism containing the electric lock.

Figure 8c shows the electric lock with the rear lever(112c) for manual unlock.

Figure 8d shows the locking mechanism that comprises the electric lock with the key lock(112d) for manual unlock.

Figure 9 shows the locking mechanism comprising the electromagnetic lock.

Figure 10 shows how the locking mechanism (104) with electromagnetic lock operates to lock onto the metal plate (103c) of front frame (103).

Figure 11 shows another implementation of apparatus where front frame(103) is lowered from right to left onto side frame (102).

DETAILED DESCRIPTION OF THE INVENTION

The present invention provides an apparatus to restraint a patient to the toilet seat, and to prevent the patient from getting up on their own. Only nursing staff have the means to release the patient from the restraint and to help the patient get up, clean, dress and walk them back to their bed.

First refer to figure 2 and then figure 1. Our invention is a patient safety restraint apparatus that comprises two side frames (101, 102) positioned on each side of a toilet bowl (107) , a front frame (103) where one end could slide along and could pivot on side frame (101), and the other end of the front frame (103) could be lowered to straddle onto the second side frame(102).

The apparatus further comprises a locking mechanism(104) that is attached to the second side frame (102). The moment when front frame (103) is lowered onto the second side frame(102), the locking mechanism (104) comprises means to automatically lock onto said front frame (103).

The locking mechanism (104) further comprises means to be unlocked by an electric signal.
The apparatus further comprises an electronic control box (105) which upon activation by an RFID card (106), could send an electric signal to unlock the locking mechanism (104).

Each component of the invention apparatus would be further explained in detail in the following.

Side Frames
The two side frames (101, 102) with the U-shape structure shown in figure 1 is just one example. Possible examples of side frame structure include figures 4, 4a, 4b,4c,4d, 4e, but are not limited to these. It is also possible to mix or combine the use of different frame shape structure for each side frames.

If the side frame (102) need to have capability to swivel and be stored to conserve space, figure 5a, 5b is one example where this could be implemented.

Front Frame
The front frame (103) shown in figure 1 is also just one example. Possible examples of front frame shape structure include figures 6, 6a, 6b, but are not limited to these.

Refer to figure 2. The lower end of the front frame (103) could be implemented as a tube(103a) wherein the top horizontal bar of side frame (101) could be slotted within said tube(103a). This allows the front frame(103) to slide forward or backward along top horizontal bar of side frame (101). At the same time, front frame (103) could also pivot and be brought down to straddle onto side frame (102).

Storage holder for front frame
In figure 3, the front frame (103) could slide along side frame (101) to be stored at the rear and be held in the stored position by holder (108). The Y-shape holder (108) is just one example.

Locking Mechanism

In figure 7, it shows that the locking mechanism (104) is fixed to side frame (102). The fixing method could be implemented by various means. Examples are by bolts and nuts or by welding it together.

In the first embodiment, in figure 7, the locking mechanism(104) comprises an electric lock. Figure 8a shows the electric lock, where the lock tongue (112a) is kept outside the lock body, by an internal spring within the lock body. This is the normal lock tongue position of the electric lock, as seen in figure 8a.

When an electric signal is applied to the electric lock via the wires (112b), the electric signal would pull and overcome the force of the internal spring to retract the lock tongue into the lock body. When the electric signal is reset or removed, the lock tongue would be pushed out of the lock body by the internal spring, back to the normal lock tongue position as in figure 8a.

In figure 8b, the electric lock is mounted within the locking mechanism (104) with the sloping lock tongue (112a) facing upwards. There is a slot opening at the top of the locking mechanism(104) directly above the sloping lock tongue.

In figure 7, near the top end of front frame (103) comprises one or more hooks(103b). Four hooks were used as an example in figure 7.

When the front frame(103) is lowered onto side frame 102, such that one of the hooks (103b) is aligned and inserted directly into the top opening of the locking mechanism (104), the hook would push the sloping lock tongue into the lock body, and as the hook is lowered further beyond, the lock tongue would be pushed out of the lock body by the internal spring, to automatically lock the hook (103b) of the front frame to the locking mechanism (104). At any one time, only one hook is engaged into the opening slot of the locking mechanism, to be locked.

By sliding the front frame (103) along side frame(101) and selecting different hook to be inserted into the top opening slot of the locking mechanism, the spacing contained within the front frame to the back of the toilet seat could be changed to accommodate different size patient.

Electronic Control Box

In figure 1, the electronic control box (105) comprises means to read an RFID card(106).
When an RFID card (106) is brought near to activate the electronic control box(105), the electronic control box would send an electric signal to unlock the locking mechanism (104).

The electric signal from the electronic control box travels to the locking mechanism via wires that runs within tube 109 and internally within side frame(102).

The electronic control box could have settings to keep the locking mechanism unlock for a certain duration of time. Any duration between 3 to 10 seconds is a suitable time. In our example, we set the unlock duration to about 4 seconds, during which the front frame could be lifted up.

Push button Release Switch

In figure 3a, the electronic control box(105) could further comprise means to read a manual release switch such as a push button switch (110) which upon being pressed, would activate the electronic control box(105) to send an electric signal to unlock the locking mechanism (104).

Remote Control Device

In figure 3a, the electronic control box (105) could further comprise means to read the signal transmitted by a remote control device (111), which could activate the electronic control box (105) to send an electric signal to unlock the locking mechanism (104).

Manual Unlock

See figure 8c and 8d.

The electric lock further comprises means to manually unlock the electric lock. The means for manual unlock comprises a lever (112c) fixed to the rear of the electric lock as in figure 8c. When the lever (112c) is pushed backwards, it would pull the lock tongue (112a) into the lock body to unlock the electric lock. As the electric lock is contained within the locking mechanism (104), a key lock(112d) could be installed on the locking mechanism such that by turning this key lock, it would manually push said lever(112c) backwards to unlock the locking mechanism. When the key lock is released, the internal spring in the lock, would push the lock tongue(112a) out of the lock body to lock the locking mechanism.

The feature for manual unlock is useful during an electrical power outage where manual unlock is required.

Electromagnetic Locking

In another embodiment, the locking mechanism could be implemented by means of an electromagnetic lock. For this implementation, a metal plate (103c) is fixed near the top end of front frame (103) in figure 10. The locking mechanism(104) is fixed to side frame (102).

Within the locking mechanism (104), comprises an electromagnet (113a) as in figure 9. When an electric signal is applied to the terminal wires (113b), an electromagnetic field would be generated in the electromagnet (113a).

In figure 10, when the front frame (103) is lowered onto side frame(102), the metal plate(103c) would come in direct contact with the electromagnet(113a) in the locking mechanism(104), and be held together by the electromagnetic field, thus locking the front frame.

When an RFID card is brought near, to activate the electronic control box, the electronic control box would send a reset signal or remove the electric signal such that the electromagnetic field in the locking mechanism disappear, for a certain duration of time. A duration of about 4 seconds could be set as an example, during which the front frame(103) could be lifted up.

When our locking mechanism is implemented using electromagnetic locking, there is no need to include any manual unlocking means to be used during power outage. During power outage, there would be no electricity, and the locking mechanism would automatically be unlocked, due to absence of electric signal.

As the metal plate (103c) is much longer than the locking mechanism, by sliding the front frame(103) along side frame(101), lowering it onto side frame (102), such that a different part of the metal plate(103c) is in contact with the electromagnet(113a), the space between the front frame (103) to the back of the toilet seat could be changed to accommodate different size patient.

Left hand and Right hand implementation of invention

Depending on the layout in the toilet, our invention apparatus could be implemented where the front frame could be lowered from right to left onto side frame 102 as in figure 11. That is, the implementation is like a mirror image implementation of earlier invention description.

Electronic Control Box integrated to Locking Mechanism

As an option, the electronic control box could also be integrated to be contained within the locking mechanism (104).

CLAIMS

What is claimed is:

1. A patient safety restraint apparatus comprising :
(a) two side frames positioned on each side of a toilet bowl;
(b) a front frame where one end could slide along and could pivot on the first side frame, and the other end of the front frame could be lowered to straddle onto the second side frame;
(c) a locking mechanism that is attached to said second side frame, and further comprising means for locking onto said front frame.

2. An apparatus as in claim 1, wherein the locking mechanism comprises an electric lock, whereby the locking and unlocking could be controlled by an electric signal.

3. An apparatus as in claim 1, wherein the locking mechanism comprises an electromagnetic lock, whereby the locking and unlocking could be controlled by an electric signal.

4. An apparatus as in claim 2 or 3 further comprising :
an electronic control box wherein the electronic control box comprises means to read an RFID card, and means to send an electric signal to unlock the locking mechanism.

5. An apparatus as in claim 1,2, 3 or 4, further comprising means whereby the locking of said front frame to said locking mechanism occurs, the moment said front frame is lowered onto said locking mechanism that is attached to said second side frame.

6. An apparatus as in claim 1,2, 3, 4 or 5 whereby said front frame could slide along first side frame, to be stored at rear position of said first side frame; and whereby the apparatus further comprising a holder means to hold said front frame in the stored position.

7. An apparatus as in claim 1,2 or 4 wherein the locking mechanism further comprises a key lock which could manually lock or unlock the locking mechanism;

8. An apparatus as in claim 4 wherein the electronic control box could further read a release switch such as a push button switch, and send an electric signal to unlock the locking mechanism.

9. An apparatus as in claim 4 wherein the electronic control box could further read the signal from a remote control device, and send an electric signal to unlock the locking mechanism.

10. An apparatus as in claim 4, 8 or 9 wherein the electronic control box could be integrated and be contained within the locking mechanism.

11. An apparatus as in claim 1,2, 3 or 4 whereby the second side frame comprises means to swivel and be stored in a different position such as a vertical position.