On making nursing undergraduate human reproductive physiology content meaningful and relevant: Discussion of human pleasure in its biological context

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SUMMARY

The traditional presentation of the Reproductive Physiology component in an Anatomy and Physiology course to nursing undergraduates focuses on the broad aspects of hormonal regulation of reproduction and gonadal anatomy, with the role of the higher centres of the brain omitted. An introductory discussion is proposed which could precede the lectures on the reproductive organs. The discussion gives an overview of the biological significance of human pleasure, the involvement of the neurotransmitter dopamine, and the role of pleasure in the survival of the individual and even species. Pleasure stimuli (positive and negative) and the biological significance of naturally-induced pleasurable experiences are briefly discussed in the context of reproduction and the preservation of genetic material with an aim to foster relevancy between subject material and human behaviour in any type of society. The tenderness of this aspect of the human existence is well-understood because of its invariable association with soul-revealing human expressions such as love, infatuation, sexual flirtations, all of which are underpinned by arousal, desire and/or pleasure. Assuming that increased knowledge correlates with increased confidence, the proposed approach may provide the nurse with an adequate knowledge base to overcome well-known barriers in communicating with their patients about matters of sexual health and intimacy.

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Introduction

A nurse’s primary concern in any context is the patient’s contentment, well-being and affectivity, which gives life its highly desirable quality. All of these are in line with the holistic nature of nursing care. It has been proposed that pleasure and pain are really two extremes of the same continuum (Houdart, 1999). By extension then, it could be expected that contentment, well-being and affectivity would most likely be associated with the pleasure half of the continuum although gravitating somewhat towards the centre of that continuum, and boredom midway in the continuum. Pleasure and enjoyment are defined as ‘a state of happiness or personal satisfaction’, and as ‘sensual gratification or indulgence’, respectively (Morris, 1973). Pleasure, the least forceful of the two, suggests ‘superficial and transitory emotion resulting from the conscious pursuit of happiness’, while enjoyment is ‘relatively stronger in its implication of sustained happiness’ (Morris, 1973). Whereas the negative side of the continuum, i.e. pain is well-studied in all of the health sciences, scattered information exists on the role of pleasure in a human being’s welfare.

Physiologically, the pleasure experience is dependent on sensory stimuli from sources external to and internal in the body, e.g. visual and taste sensations. These explain the association of pleasure and enjoyment with, e.g. meeting friends, partying, holidays, listening to music, eating, and sexual intercourse. Unlike the others, pleasure associated with eating and sex is, biologically speaking, vital for human existence because acquiring and eating food, and sex are critical for individual/species survival (Esch and Stefano, 2004; Balfour et al., 2004).

Assuming then that the nurse’s professional mandate of holistic and empathetic care falls within the pleasure–pain continuum, it is reasonable to argue then that current trends, e.g. inappropriate or excessive pleasure-seeking behaviour, in contemporary human society, and the unfortunate consequences of these, may place extra demands on the practising nurse’s knowledge base, especially when the theory behind basic human pleasure experience is lacking or poorly understood in the undergraduate nursing curriculum. For example, partner violence or infidelity fuelled by jealousy and/or other power dynamics, and marital strife are the result of soul-revealing human expressions, such as love, infatuation, acceptance, sexual flirtations, with arousal, desire and/or pleasure often as motivating factors. One way in which human societies have tried for centuries to deal with such matters was with the imposition of religious/cultural restrictions and occurrence of taboos such as shame or guilt. An extreme view held of sex in this regard is that, within the confines of marriage, sexual obligation for purposes of procreation takes precedence over sexual pleasure (Higgins et al., 2009).
Literature review

This paper intends to demonstrate how this message can be conveyed across to first year nursing students in a meaningful, though scientific way, irrespective of traditional or cultural contexts, and to draw attention to this neglected aspect in the teaching of human sexuality to professionals who have a professional mandate that spans the pain–pleasure continuum.

Several databases were searched including the British Nursing Index, EMBASE, ERIC, MEDLINE, OVID Nursing, PubMed, and SveMed+. In addition, searches were performed separately on well-known search platforms, including ScienceDirect, Wiley InterScience and Springer. Search terms included nursing practise, sexuality, biology of pleasure, sex education, and physiology education. Although nursing practise and human sexuality were the topics of many investigations, none of these references touched on the topic of sexual pleasure or its biological significance. Houdart (1999) likewise found that a search of all literature in medicine, physiology, neurology and other subjects revealed a large body of evidence about or relating to pain, but nothing on pleasure. One relevant reference found was that of Norris (1985) who questioned the assumption that the goal of nursing is primitive pleasure, i.e. that nurses assist people to a basic state of pleasure. Other references which touched on the topic of health care and sexual pleasure include the survey results of Randolph et al. (2007), Higgins et al. (2008) and Brown et al. (2008) who drew attention to the negative experiences with male condoms, because of the perceived decrease in sexual pleasure, but which simultaneously has major implications for sexual risk practises and the sexual health of the woman.

The rest of the hundreds of references about nursing practise and human sexuality are generally sanitised portrayals of sexuality, with sexual intercourse relegated to an almost emotionally neutral act. All these references, e.g. Reynolds and Magnan (2005), Higgins et al. (2009), Jaarsma et al. (2010) and Julien et al. (2010), to name a few, have one recurring theme, i.e. nurses’ lack of comfort, confidence, embarrassment and lack of knowledge as barriers in discussing sexuality and intimate matters with their patients.

Inasmuch as attention having been drawn to perceptions of increasing medicalisation of everyday life, including physical intimacy (Foucalt, 1973; Armstrong, 2002), there is general agreement that the health care professional’s mandate entails viewing the patient in an empathetic, supportive manner as a holistic being with biological, psychological, social, sexual and spiritual needs (Higgins et al., 2009). These notions agree in principle with other general sentiments calling for educational modules that transcend the traditional con DH5.

To further simplify the idea that pleasure is a source of biologically beneficial motivational behaviour (Esch and Stefano, 2004), it is stated that “if there was no pleasure attached to the acts of eating or sex, nobody would have bothered to eat or have sex.” In order to ensure the repeat of life-sustaining activities, the nervous system is structured such that these activities are indeed associated with pleasure or reward (National Institute of Drug Abuse, 2008). Each time the brain’s reward circuit is activated, the brain notes that something important is happening that needs to be remembered, and in this way we are taught to do it over and over again, without ever thinking about it. Thus, the more pleasurable an experience is, the more we are likely to repeat the action that elicited that feeling of pleasure. However, psychomotor stimulants, such as cocaine, amphetamine, opiates, nicotine and alcohol, also cause the release of dopamine in the NAc, regardless of the mechanism of action (Di Chiara and Imperato, 1988). For example, just one dose of cocaine can release two to 10 times the amount of dopamine released by your favourite meal, person, song or sight (National Institute of Drug abuse, 2008). A recent study in healthy individuals also showed the release of dopamine in specifically the NAc in response to music occurred during the experience of peak emotional responses to music (Salimpoor et al., 2011). Since sight is the sensory stimulus often driving predominantly male sexual pleasures which are commonly associated with socially negative phenomena such as internet pornography, frequenting on strip clubs and brothels, and prostitution within or outside of strip bars/clubs, it should be readily apparent how the release of more than the natural amount of dopamine through this type of sensory stimulation may hijack signalling mechanisms in

Lecture content

Introduction to lecture

The lecture series begins by stating that at no other stage in human history than now, has humanity been so consumed with obtaining pleasure and enjoyment, often through positive experiences (e.g. food, social contact, music of all tastes and varieties) but regrettably also more and more through negative/destructive means (e.g. through use of addictive drugs, alone or combination with music, and sexual exploitation of women). Arguments have been put forward that all of these are symptomatic of societies trying to cope with the stress of fast-paced modern life. Whereas biology makes no distinction among the various sources of pleasure, humans have labelled different sources of pleasure as “good” or “bad”.

The innermost region of the most recognisable part of the brain (the cerebrum), is the limbic system, which acts as the link between higher cognitive functions, such as reasoning, and more primitive emotional responses, such as fear. A particular part of the limbic system rising out of the brain stem, comprising the ventral tegmental area (VTA) near the base of the brain, which in turn projects into the nearby nuclear accumbens (NAc), governs all behaviours in which motivation plays a central role, including acquiring food, and having sex (Balfour et al., 2004). The VTA is thought to be the positive reinforcement centre, or ‘pleasure centre’ and the NAc is involved in the processing or interpretation of signals. Dopamine is the principal neurotransmitter involved in these neural pathways of motivation and reward which are central to pleasure and which motivates the repetition of activities critical for our existence and survival.

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human desire, i.e. pleasure/euphoria and the involvement of the neurotransmitter, dopamine. Links can also be made in a simplified manner with some of the underlying cell biology and neurobiology of human sexual physiology and individual/species survival to foster relevancy between subject material and human behaviour in various cultural contexts. Although not tested empirically, the scientific discourse outlined here reflects the teacher’s teaching and research experience in reproductive biology.
neural pathways associated with normal levels of pleasure or reward, leading to addiction.

Considering that the area of the cerebral cortex devoted to planning of complex movements, elaboration of thoughts, and self-control, i.e. the prefrontal cortex, also provides modulatory input to the NAc, it should become apparent how goal-directed behaviour to achieve physiologically necessary aims comes about. It may be noted that the unhealthy, uncontrolled pursuit of euphoria through, for example, substance abuse, may therefore cause an actual reduction in the volume of the prefrontal cortex with the powers for rational thinking also clearly reduced (Fowler et al., 2007).

Preservation of genetic material

The lecture digresses briefly linking the need for food and sex with an explanation of individual/species survival, and reproduction at the cellular level (mitosis and meiosis). Every living thing has an innate desire to preserve its genetic material (DNA) since its unique genotype defines the organism with its unique behaviours and physical traits. In other words, every organism has an instinctive drive to “live forever”. One of the slides in the digital presentation can be that of a man standing and pressing the copy button of a copy machine, and little copies of himself hop out of the machine! Attention is drawn to any animal (carnivorous or herbivorous) in the wild, such as a lion, whose whole existence revolves around essentially two activities, i.e. hunting for food and finding a mate to pass on its genes. To say that humans are no different is an overstatement, but the essence of the point is understood.

Attention is then briefly drawn to what was learnt about mitosis at the start of the semester. Cells can make exact copies of themselves in response to several stimuli, not least when neighbouring cells are dying via physiological death or apoptosis. Sensing mechanisms exist in all tissues in all organisms, setting in motion a series of cellular events to replace lost or damaged cells. It may be mentioned that many unicellular organisms in fact reproduce via mitosis, and even multicellular organisms such as lizards, can regenerate themselves completely in the absence of a fertilising spermatozoon, a process called parthenogenesis (Johnson and Everitt, 2005). Since most cells of the human body have a limited number of mitoses, the simplistic conclusion is made, for time’s sake, that sexual reproduction is in fact a mechanism to reproduce the entire human body such as to ensure preservation of the DNA. Sexual reproduction involves a special form of cell division called meiosis, which only occurs in the gonads (testes and ovaries). During meiosis (also called reduction division) in each individual, special cells called sperm or egg cells are formed, each containing one copy of the individual’s DNA which is essentially a full set of either one of the parents DNA. (Other body cells, which are only capable of mitosis, each contain a copy of both the mother and father’s DNA, and daughter cells formed through mitosis are exact replicas of the cell which underwent mitosis.) Evidence suggests that a complete set of chromosomes from a father and a complete set from a mother are prerequisites for normal and complete development in the offspring (Johnson and Everitt, 2005).

This brings us back to the original notion that the father and mother “live forever” in their offspring and their DNA is preserved through their children and their children’s children. Although many young adults may express their need for independence, biologically speaking though, a set of physiological responses become activated sooner or later during chronological ageing, and which steers the thought life towards awareness of loneliness, friendship, partnership and having children of their own, etc., in essence, innate concerns about survival of the individual’s DNA. One of the slides in the presentation shows the results of a 2007 survey by a national woman’s magazine in Norway on why people have sex. Of the 237 reasons the psychologists received from both sexes, four reasons stood out, with physical pleasure the no.1 reason and goal-directed reasons such as the wish to have a baby, the second most important reason. The point is made that the lasting influence of the gonadal sex steroids at the peak of our reproductive prowess, by and large, underpins these unconscious, innate desires of us as biological beings, including the innocent desire to have a baby, all of which is consistent with the cycle in nature.

If necessary, the biological sense of this point can be further illustrated with the following true story. A woman was in a coma and hospitalised for 8 years. Her respiratory system and renal system were working though, and there was certainly no pleasure involved in the function of these two systems. In fact, this woman survived only because she was kept in an institution and fed intravenously. If she was lying in a coma unknown to anyone out in a forest, she would have probably died, not least because of starvation, and she would not have been able to transfer her genetic complement to anyone! Thus, whereas the respiratory and renal systems function autonomously (involuntarily) and independently of a motivation–reward circuit, the acts of feeding and sex are, by and large, consciously initiated behaviours linked to the brain’s reward circuitry. Therefore, when human beings talk of sex or food, these topics invariably conjure up memories of pleasurable, euphoric, satisfying experiences.

Dopamine and behaviour

The key role played by dopamine in human behaviour may be further emphasised by showing a slide with some relevant titles of clinical studies, including that of Giladi et al. (2007) entitled, “New onset of heightened interest or drive for gambling, shopping, eating or sexual activity in patients with Parkinson’s disease: the role of dopamine agonist treatment and age at motor symptoms onset”. Since this is a first year class, it should be briefly mentioned that Parkinson’s patients are afflicted with a dopamine deficiency in an area of the brain vital for voluntary muscle movement, i.e. the substantia nigra. Normally, the dopamine-secreting neurons in the substantia nigra inhibit the activity of the basal ganglia (which include the caudate nucleus), all of which are vital for voluntary movements. Upon mentioning this case in class, one student who worked as a nursing home assistant, expressed her amazement at this background information, which is barely touched upon during the nervous system lectures, and confirmed all of this as accurately describing a Parkinson’s disease patient at the home who was treated with a powerful dopamine agonist. This man apparently prowled the streets at night in search of women. Interestingly, the anticipation of an abstract reward results in dopamine release in the caudate nucleus in the healthy individual (Salimpoor et al., 2011), findings which underscore the behaviours observed in the Parkinson’s disease patient treated with a powerful dopamine agonist. Another relevant example mentioned was that of a 24 year old religious conservative male’s battle with uncontrolled addiction to internet pornography and masturbatory behaviour, and successful treatment with naltrexone, a drug which indirectly inhibits dopaminergic neurons in the VTA (Bostwick and Bucci, 2008). The latter study will certainly attract the attention of all web-surfing males in the class.

It is reiterated that reproducing the body is, biologically speaking, of such a high priority for human beings or any organism for that matter, that a specific group of cells is set aside for this purpose in the human embryo already at five weeks gestation (Johnson and Everitt, 2005). This introductory session is concluded by stating very simplistically that our desire for reproduction is motivated by naturally pleasure-seeking behaviour operating mainly through the senses (sight, smell, touch and hearing). The sensory information picked up from the environment is ultimately processed and integrated by the hormonally primed central nervous system of the sexually mature individual, all of which eventually is expressed as sexual thoughts and desire. For example,
the neurons expressing the protein receptor molecules for the two main sex steroids, androgen and oestrogen, are concentrated in the NAc, a main part of the mesolimbic reward centre (Stevens, 2002). Evidence also indicates that sex steroids play a vital modulating role on the dopamine system in these areas, because oophorectomy (removal of the ovaries) in the monkey causes the permanent loss of 30% of dopaminergic neurons from the substantia nigra, the neural tissue specifically damaged in Parkinson’s disease (Leranth et al., 2000). The simplistic conclusion may be made at this stage that the prepubertal child is incapable of initiating pleasurable sexual behaviour in a rational manner for the simple reason that the appropriate secretion of the sex steroids from the gonads is lacking at this stage of human development, all of which is damning evidence against paedophilia and sexual abuse of children.

Taken together then, this introductory session provides an adequate backdrop for the remainder of the topic of human sexual physiology, i.e. the study of the organs in the body (gonads) whose main functions are to produce sex cells (eggs and sperm) and sex steroids, the latter driving the development of the former in a cyclical manner in females and in a continuous manner in males. If the overwhelming positive grading of the entire Physiology course is anything to go by, this suggests that the scientific rationale outlined here struck a chord with the students’ grasp of the topic.

Conclusions

A great deal of human sexuality has been clouded in mystery since time immemorial and associated with various cultural traditions and practices, which does not render nursing practise involving this aspect of human life any easier. The tenderness of this aspect of the human existence is well-understood in all cultures, because of its invariable association with soul-revealing human expressions such as love, infatuation, and sexual flirtations, all of which are underpinned by arousal, desire and/or pleasure. Equipping the nurse with the necessary biological knowledge about pleasure-seeking behaviour, may promote greater confidence and the easing of other barriers relating to enquiries about a patient’s intimate life, and associated health, social, community and ethical issues faced in nursing practise.

References


