"Holy scan" or "picture of the baby?" Biomedicalization and stratification in the use of obstetric ultrasound in Rio de Janeiro

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Abstract

Based on ethnographic studies conducted at public and private healthcare facilities in Rio de Janeiro, we argue that the dissemination of (bio)medicalization varies in accordance with the social stratum of the expectant mothers, thereby producing thoroughly distinct fetal and pregnant bodies, as well as different gestational processes. Starting from the basic premise that biomedicalization represents a transformation in the process of medicalization, characterized by the growing incorporation of technoscience into biomedicine, the observed universes displayed different stages in this transformation, consonant with the social stratification of the women who underwent the scans.

Keywords: obstetric ultrasound; biomedicalization; stratification; socio-technical studies; ethnography.

> The equipment doesn't print out photos or reports… The scans aren't documented, leaving only the handwritten report. [I was] struck by how quickly the scans were completed – five minutes to do the scan, write up the report, and send the mother-to-be on her way with a shout of 'Next!' – [and] I spoke with Doctor Lúcia,[1] who joked: 'It's the *exame bento* [literally, holy scan]… Not familiar with it?' I tell her no. She explains, 'You make the sign of the cross on the mother's belly…a vertical line, a horizontal line, and it's over' (field notes, public maternity hospital).
>
> When the scan is over, M. (*mother-to-be*) expresses her frustration because she forgot to bring a tape for the recording; the doctor asks, 'Do you have a computer at home?' Upon hearing the affirmative reply, he suggests, 'Go over to the mall, buy a CD, and I'll download it for you… The scan is recorded on the machine'. (Chazan, 2007, p.159)

Based on a case study of obstetric ultrasound scans in Rio de Janeiro, this article discusses an underexplored aspect of the theory of biomedicalization (Clarke et al., 2003): its stratified nature. We look at available prenatal imaging techniques, unequal access to them, and the physician/technology/patient relation, examining how this impacts sensibilities and perceptions of pregnancy, the construction of bodies (the pregnant woman's and the fetus's), and appropriations by users. The material used in our analysis was sourced from ethnographic studies conducted by one of the authors in three different kinds of settings: three private medical clinics, one public maternity hospital (both settings were observed in 2003),[2] and one public teaching hospital (observed in 2008).[3] We noted disparities between the universes that, in the view of our analysis, made apparent the existence of heterogeneous stages in the processes of medicalization and biomedicalization.

This article endeavors to contribute to a discussion about the stratification of health care in Brazil, following a line of research developed by Sanabria (2010); it is further intended to cast light on the construction, or non-construction, of citizenship even before birth. We suggest that the logic guiding the establishment of biomedicalization in certain spaces and the continuation of classic processes of medicalization in other spaces can be tied to the notion of stratification. Few empirical studies have explored stratification from the perspective introduced by Clarke's group and, in the words of these researchers, "much remains to be done" (Clarke et al., 2010b, p.30).

Medicalization and biomedicalization

The notion of medicalization emerged within the field of sociology in the 1970s and in subsequent decades became broadly employed as a conceptual resource in scholarly literature on health, disease, and life processes (Riska, 2010; Zola, 1972; Conrad, 2007, p.4; Stults, Conrad, 2010).

The earliest work in this arena focused on analyzing how behavior or conditions that had previously been understood to be forms of moral deviance were transformed into

treatable illnesses (Conrad, Schneider, 1992). As highlighted by Riska (2010, p.150), symbolic interactionism and labeling theory held sway in the theory of medical sociology in the 1960s and played an influential role in the beginnings of the concept of medicalization. Attention later shifted away from deviance to other domains, including potentially shareable human experiences, like life phases (birth, childhood, pregnancy, aging, death), conditions (depression, menopause, shyness), domains (sexuality, learning), and even hair loss (Conrad, 2007; Zorzanelli, Ortega, Bezerra Jr., 2014). This shift fostered a much broader use of the term, which was assigned manifold meanings (Zorzanelli, Ortega, Bezerra Jr., 2014). Concomitantly, the influence of symbolic interactionism gave way to social constructionism (Riska, 2010).

Another major branch in the development of studies on medicalization ties in with the work of Michel Foucault (1984, 1990, 1998). From his perspective, concern for reproduction, childhood, and health is imbued with profound (bio)political significance. The statistical notion of "infant mortality" was constructed over the course of the nineteenth century, more accurately delimiting and defining the phases of childhood (Armstrong, 1986), while infant health became a major concern. In the latter half of the twentieth century, the fetus emerged as an object of medical and social interest and, with the development of fetal ultrasound technology in the 1960s, the bodies of pregnant women and their fetuses could be scrutinized and monitored. Hence, we can see the expansion of biopower as encompassing ever earlier phases of life (Chazan, 2000).

Clarke et al. (2003, p.167) first proposed the term "biomedicalization," which refers to a new biopolitical economy of medicine and is applicable to analyses of the increasingly central role of technoscience and its consumption in biomedicine as of 1985. Through the application of computer and information technology in the field of biotechnology, a gamut of technoscientific innovations have been introduced at various levels, prompting changes "in the constitution, organization, and practices of contemporary biomedicine" (Clarke et al., 2010b, p.1). An important change wrought by these modifications is a shift away from control over medical phenomena, through their translation in biomedical terms, toward the transformation of life phenomena per se, made possible by technoscience (Clarke, Shim, 2011, p.173). The scrutinizing technological inventions that perform biochemical and visual exams have made it possible to monitor and transform various aspects of life and bodies. According to Clarke (2010b, p.134), "in the biomedicalization era, the visual 'ideal of transparency' extended clinically by the endoscope during the medicalization era is further extended by video, digitalization, and robotics". The concept of "Biomedical Technoservice Complex, Inc." serves to underscore the corporatist, privatized nature of research, products, and services during this period, which witnessed the growing "commodification" of health and its transformation into a consumer good. One of the underlying premises is that biomedical knowledge, technology, services, and capital are coproduced (Clarke et al., 2010b, p.1). In this article, we argue that this coproduction enables us to understand why a technology like the ultrasound scan serves as a vector of biomedicalization or medicalization, depending upon its context.

Stratification

Clarke and coauthors hold that stratification is not exclusive to biomedicalization but is already an aspect of medicalization processes, in keeping with Ehrenreich and Ehrenreich's (1978) concepts of cooptative medicalization and exclusionary disciplining. While cooptative medicalization refers to the process that ultimately defined medicalization – that is "to the jurisdictional expansion of modern medicine – extending into areas of life previously not deemed medical," exclusionary disciplining "refers to the simultaneous exclusionary actions of medicine that erect barriers to access to medical institutions and resources that target and affect particular individuals and segments of populations" (Clarke et al., 2010a, p.61).

Cooptative medicalization has tended to be the rule for middle- and upper-class groups, especially women, while "exclusionary tendencies or particular kinds of cooptative medicalization (such as provision or imposition of birth control and sterilization) have prevailed for people of color and the poor" (Clarke et al., 2010a, p.61). This issue has also been explored and discussed by Sanabria (2010) in the context of Brazil. Clarke and coauthors (2010a, p.61) contend that this dual tendency persists in biomedicalization in increasingly complex ways: "Many people are completely bypassed, others impacted unevenly, and while some protest excessive biomedical intervention into their lives, others lack basic care".

Stratification is not new to the social sciences either as a term or a fact, and it is directly reflected in access to health care. Starting in the 1960s, for example, Boltanski (2004) investigated how this phenomenon shaped relations between healthcare providers and patients. While the term "stratification" has not been used in the anthropology of health in Brazil, the field here has nevertheless been exploring the implications of class and race differences, both in appropriations of phenomena of health/disease by individuals (Duarte, 1986) and in access to healthcare services. Papers that address abortion in Brazil are emblematic, showing how social class is determinant in "abortion itineraries" – that is, abortions end safely for those who can afford it and are extremely dangerous, degrading, and often deadly, for poor women (Heilborn et al., 2012).[4]

In the 1980s, Lo Bianco (1985) studied what she called the "psychologization" of the fetus in Rio de Janeiro and showed how pregnancy was experienced differently depending on a woman's social status. For the middle classes, pregnancy represented a stage "in" motherhood, while for the poor it was merely a transition "into" motherhood. While middle-class women "subjectivized their future babies," viewing them as "independent" from themselves and "relating to" them, the pregnant poor saw motherhood as beginning "after" the birth of their child. In the 1990s, when the use of fetal ultrasound gained firm footing throughout Brazil, it reinforced and also reshaped perceptions and sensibilities about pregnancy and the unborn child, which came to form an integrated set of perceptions, beliefs, and values that Chazan (2005, p.205) has called the "ultrasound culture." The idea took hold in Brazil that ultrasound scans were "indispensable" to prenatal care and this culture has been incorporated by all social classes since then, albeit displaying heterogeneous features molded in part by social stratum. Studied by Chazan (2008, 2007, 2005) in Rio de Janeiro, this phenomenon was also becoming generalized elsewhere around the same time (Draper, 2002, p.781).

Viewed from the perspective of biomedicalization studies, stratification is closely linked to the commodification of health and, as an essential focus of health assistance, health care becomes delineated and shaped through its transformation into an object of consumption. In this sense, stratified biomedicalization also refers to inequalities in the modes of distribution of biomedical technology and access to it (Clarke, 2010a, p.392). In the field we are exploring, whoever can afford healthcare services merits the attention of providers and has access to state-of-the-art technologies. The commodification of health and the heightened development of drugs, tests, and diagnostic technologies are key features of biomedicalization, and their interrelation fuels, shapes, and substantially contributes to the entrenchment of stratified biomedicalization (Clarke et al., 2003, p.170).

Based on a re-analysis of data gathered during ultrasound scans conducted in three different universes, we argue that three different paradigms co-exist in Brazil, which we refer to in broad terms as: the traditional (or statistical) biopolitics of populations, medicalization, and biomedicalization.[5]

The ethnographic studies

Our research interest was to observe the interactions that transpired during obstetric ultrasound scans performed in different contexts. Interviews with the expectant women therefore were not within the scope of this research. Observations were made at three clinics in the private setting (denominated A, B, and C) and at two public facilities (a teaching hospital and a maternity hospital).[6] Clinics A and B provided services covered by health insurance while clinic C served only self-pay patients; at the time, clinic C, which was affiliated with an assisted reproduction center, charged the equivalent of USD30 to USD300 per scan. Roughly speaking, we viewed clinic A as primarily serving the middle- and upper-middle classes; B, the middle- and lower-middle classes; and C, the upper-middle and upper.[7]

The public teaching and maternity hospitals both offered free care and primarily served poor women. In Brazil, public health care is a universal right guaranteed under the 1988 Constitution, which laid the foundations of the Unified Health System (Sistema Único de Saúde – SUS). The quality of care varies in accordance with location and other variables, a matter that falls outside the scope of this discussion.[8]

In 1992, the ultrasound was defined as a medical act in Brazil, meaning this exam cannot be performed by non-physicians. Thus, physicians conducted all of the scans observed in the three contexts above.

The clinics, or *"meio quilo de gente!"* ("a teeny tiny one-pound person!")

The clinics were observed in 2003 (Chazan, 2008, 2007, 2005). The mothers-to-be had to have an appointment and remained in the waiting room until their names were called. The patient's right to privacy, the comfort level at the facility, and the time spent on the actual scan varied from clinic to clinic (Chazan, 2005, p.189). At clinic B, the scan took ten to 15 minutes; at A, at least twenty; and at C, from thirty minutes to an hour and a half, depending on how complicated the pregnancy was. At clinics A and C, which offered 3D technology,

the scan often lasted longer because the mother-to-be would ask for "a picture of the baby" or because she wanted to know its sex. For technical reasons, on occasion it took some time to get a good 3D image or visibilize the genitalia of the fetus, and the providers clearly endeavored to satisfy the patient's requests.[9] Moreover, the providers were often bothered when the woman did not react favorably to the fetal images or remained apathetic, and they would employ various strategies to awaken the woman's interest (Chazan, 2007, p.95). Whether requested to or not, the providers strove to "show the baby;" this took up a substantially large portion of the scan and also lent it the flavor of a show, a facet underscored by the frequent presence of one or more people accompanying the mother.

The equipment used at the three clinics varied in technological sophistication. Clinic C had equipment of the latest generation, which could perform all types of ultrasounds;[10] it also had 29-inch TV screens,[11] where the expectant mother and anyone accompanying her could watch the scan. At A, the equipment varied from room to room and included 3D, 2D, Doppler, and a 20-inch TV. The equipment at clinic B had been manufactured more than five years earlier;[12] one device could also do Doppler but the other, only 2D. There were no television monitors in the rooms. All three clinics furnished images and biometric data, printed out by the equipment itself. The women often brought along VHS tapes to record the entire scan so they could show their relatives and friends at home. At the time, it was just becoming possible to download the scan to a CD.

Although the expectant women received attentive care at all three clinics, there were hierarchical differences in the doctor-patient relation. At all three, the physicians engaged in much conversation with the women. At C, whose clientele came from a high socioeconomic level, the doctors were especially solicitous in quickly responding to requests. At A, when the providers were in the doctors' room and therefore not within hearing distance of the women, they assumed hierarchically superior positions toward their clients from a discursive standpoint, although the same was not true during their actual practice. At B, where the clientele was the least economically advantaged of the three, at no point was there any sign of discourse or practices that would suggest any type of hierarchization. One cannot overlook either the idiosyncratic differences between providers or the fact that at all three clinics there was an implicit hierarchy because of the knowledge possessed by the ultrasound physicians.

In addition to the concern over maintaining a good standard on the scans, the aspect of consumption figured in at two levels and providers aimed their strategies at both of these, whether consciously or not. The first aspect related to consumption was the provider's and clinic's reputations among the referring obstetricians. The most apparent practices that reflected this concern were the production of detailed reports and images that documented descriptions, along with telephone contact with obstetricians. The second level of concern was focused on the clientele and found expression in efforts to "show the baby," attentiveness toward those accompanying the patient, and the furnishing of images, referred to as "photos" or "videos." At all three clinics, the wishes and demands of the women and those accompanying them thus coproduced the way the scan was performed. At clinics A and C, which had more sophisticated technology, the doctors performing the scans displayed more visible pleasure in obtaining good images, which would reinforce their prestige and credibility with referring obstetricians and clients alike.

At all three facilities, the equipment allowed the visibilized structures to be delineated and therefore highlighted, and words could also be typed alongside the images. The words might identify structures or serve to "identify" the fetus itself, that is, the chosen name could be written alongside the image of the genitalia.

The level of interaction fostered many comments about, and interpretations of, the fleeting gray images that moved across the screen. Some of the comments were about the technology, like "*This is the best movie of my life! … But it's so short!*" (Father, clinic B) (Chazan, 2007, p.158). Other remarks "subjectivized" the fetus, transforming it into a person with its own identity and idiosyncrasies, often tied to gender construction: "She *hardly moves*… *My daughter's a fine lady*… Hers [referring to pregnant friend, present at the scan] is *an athlete*. He doesn't ever stop!" (clinic A) (p.188; emphasis in the original).

The mothers-to-be immediately incorporated the fetal images into their experience of pregnancy in two ways: when it was very early in the pregnancy, by constructing the experience as a reality ("It's unbelievable… *Now I really believe* [I'm pregnant]… Up till now, it was just morning sickness." Clinic B) (Chazan, 2007, p.119; emphasis in the original) or by enabling the woman to identify the source of her bodily sensations, as in this example:

> M.: I've got a pain here… What is it?
> Dr. Henrique: It's the foot, it's there.
> M.: Ouch! He's sticking his foot into my rib! … Well, after all, son, it's cramped in there, right?! (clinic A) (Chazan, 2007, p.127).

In this particular universe, a transformation was noted in the construction both of the pregnant bodies, as visuality and sensory experiences merged, and also of the fetal bodies, previously inaccessible visually. The visibilization of the fetal bodies and of the very evolution of the pregnancy, which included measurement of parameters and identification of pathologies, made intervention feasible – for example, it might be ascertained that the birth had to take place earlier or surgery might be pre-planned for shortly after birth.[13] Thus, because the findings of the scan opened the way for interventions in the pregnancy and transformations to the bodies of the fetuses, the fetus was constructed as a person and an idiosyncratic "individual" at the same time that a "patient" identity was produced.

The public teaching hospital, or "the patient is the roadway"

The ethnographic study at the teaching hospital took place over a six-month period during 2008 and 2009 (Chazan, 2011, 2009). Because ultrasound scans are classified as a "medical act" in Brazil, teaching hospitals are an obligatory passage point and a key moment in the training of future specialists. This observation was strategic to understanding what future specialists were really being taught (Chazan, 2011).

The mothers-to-be, most of whom were poor, waited to be seen by order of arrival in a space outside the ultrasound area. Since the women were sometimes coming from their prenatal appointment, it was impossible to estimate how long they waited. In this universe, the length of each scan depended on a number of factors, principal among them whether or not medical students or residents were present. Residents were taught how to obtain and interpret

images, while the visibilized structures were pointed out to the medical students. However, factors irrelevant to the scan itself also prolonged the duration of the exam – for example, side conversations between physicians and residents on random topics or "interesting" cases (i.e., cases that might make good subjects for an article) and interruptions when other doctors came in to ask for something or just drop by to say hi to colleagues. A few middle-class patients received differentiated attention, that is, their scans slightly exceeded the average time, which was about ten minutes when no students were observing.

The two scan rooms in the imaging department were relatively small, that is, they had an area of about 97 square feet. When medical students were present (in groups of six to ten) in addition to the medical staff, resident, and the observer from the research study, things got very cramped. There was no special place for the patients to change, and gowns were hardly ever available. The whole process proceeded as if the woman's privacy were not a matter of consideration, not just because there were students present but also because other people would come and go for various reasons, like needing to grab something they had left in the room. The door to the room was sometimes closed during a transvaginal ultrasound but this did not really keep anyone from entering. In a way, there seemed to be a link between the socioeconomic status of the women receiving care and their right (or not) to privacy: "Dr. Augusta remarks indignantly… 'A lady got upset and complained about the students during a transvaginal [scan]. I told her, what do you expect at a teaching hospital?'" (Chazan, 2011, p.611).

The care provided to the mothers-to-be varied in accordance with the idiosyncratic characteristics of each provider or resident doing the scan and also with the patient's social stratum, in a subtle way. The concern with obtaining images often seemed to take total precedence over the woman's presence or welfare, as in this example:

> R1[14] continues moving the transducer over M.'s abdomen, looking for anomalies. R1 is silent, as are M. and her mother. M. is uncomfortable; perspiring, she wipes herself off. R1 does not address M. or notice her discomfort; looks for images. M. asks if there's a bucket, R1 drops everything and leaves the room; the sound of M. vomiting can be heard next. R1 grimaces in disgust. M. vomits a lot (field notes, public teaching hospital).

In stark contrast with this attitude, a different provider not only talked with the women but also palpated their bellies in some cases, while simultaneously teaching the students:

> Doctor: [to students] The fundus of the uterus is normal for 34 weeks [palpating M.'s abdomen]. You've got to have a critical eye… *You've got to* palpate [the belly]. Oligohydramnios...[15] [taking M.'s abdomen with both hands and moving it gently from side to side]… There's liquid here. Add it to your scan so you can be sure; you're not *just an examiner* (field notes, public teaching hospital; speaker's emphasis).

Conversations with the pregnant women often boiled down to extracting information that should have been in their medical records, which everyone called *cola*, a slang term meaning "cheat sheet." It was as if these women had been transformed into "living medical records." This use of an expression derived from student culture suggests that the scans and the women were perceived as teaching objects. Connotatively speaking, the employment of the term *cola* also subtly implied that this practice was not considered correct. It was unusual

for the women to ask the doctors any questions, and many of the providers avoided more personal contact with the patients, rationalizing as follows: "The patient thought she was mine… She's the institution's patient" (R3, public teaching hospital) (Chazan, 2011, p.613). In a few rare cases, the woman would ask to "see the baby," and her request might or might not be satisfied.

Obtaining a good image and precise "objective" measurements ranked high in the hierarchy of values. The providers' relationship to technology, which was often "humanized," is summed up in this expression: "Be *very gentle* with that transducer!" (Doctor Camila, public teaching hospital, field notes, speaker's emphasis). Still, there were situations where the doctor relativized the "objective" data produced by the equipment and integrated it with clinical practice. A threefold doctor-technology-patient relation was established at these moments, as technology shifted to a different hierarchical plane:

> Doctor: [referring to a heated discussion between a physician who wanted 'objective' data and him, in which he relativized the numerical data from a scan] Remember that oligohydramnios? It's completely normal now. *One less preemie produced*. They say C-sections are going up… with technology, they don't go up! They said the same thing about *cardiotocography*. *It depends on the doctor's interpretation!* (field notes, public teaching hospital) (Chazan, 2009, p.32; emphasis added).

Recording the results generated by the equipment was a complicated process since it printed neither the biometric numerical data nor the fetal images, even though, theoretically, the equipment offered this technological resource. This meant there were a series of varied and intermediary steps to accomplishing this task: someone (staff doctor, resident, or medical student) would either write the data down on whatever was handy (a sheet of paper, a subscription pad, or even a paper towel) or would dictate the numbers to a secretary, who was outside the room; the secretary would next enter the data using a crude, problematic software program and would then provide the expectant mother with a printout, which the latter would take to the obstetrician responsible for her prenatal care. Following the model in the software program, the secretary would enter the data on a list of items that were to appear on the printout, which was given to the women to take home; the secretary would sometimes ask the provider about a measurement that might have been overlooked. The written report was not accompanied by any image (Chazan, 2009). Citing from field notes: "A student asks how they go about taking down data, asks if they give out photos; Doctor Camila says they don't, but 'Lucky enough we offer this scan. Why photos?'" (field notes, public teaching hospital).

Besides the fact that the "photo" was a consumer good desired by the women, it was paradoxical that an imaging service did not produce any visual record to accompany the reports, which effectively turned the physician's written interpretations of the images into absolute, unconditional truths. Only once did the observer see an image printed out, when a doctor wanted it for an article she was submitting for publication; moreover, it was not an image from an obstetrical ultrasound.

It was clear that the images produced by the equipment were meant to serve the institution's assistentialist function as well as teaching purposes – and not necessarily in that

order. This is not to say that the women received poor care, as the providers were indeed concerned about maintaining a good teaching standard. What we would like to stress here is the way in which the images were used and their hierarchization in relation to the women. The women's appropriation of the images – in the sense of lending them meaning – was relegated to the background. Ultimately, the images were meant for the students. Further in this sense, it was as if the bodies of the expectant mothers and their fetuses "belonged" to the institution and were constructed as teaching objects. However, some of the middle-class women seen at the hospital had already absorbed the flourishing ultrasound culture and were not content with the role of "teaching object:"

> M.: The other one was born at Y [renowned private hospital]. I was rich, now I'm poor.
> Doctor Augusta: The baby's seated… That's all today.
> M.: Blood flow?
> Doctor Augusta: But I like to show the baby. Do you know the sex?
> M.: Girl.
> Doctor Augusta: [confirming] Her 'wee-wee' [*pererequinha*].
> M.: I knew at 17 weeks. I said I'd only leave the scan once I knew. I only went to find out the sex. . . .I'm going to do another ultrasound just to record it. I've done five already.
> Doctor Augusta: You know how many are recommended per pregnancy? Four.
> M.: Is it bad for the baby?
> Doctor Augusta: No, it's not bad.
> M.: At 17 weeks, it was just to find out the sex (field notes, public teaching hospital).

From the standpoint of biopolitics, generally speaking, the prevailing perception at this facility was that the bodies of both the women and their fetuses were useful but not "subjectivized." There was direct reference to fetal activity only on a few occasions, in the form of complaints: "R3: He doesn't stop moving! Makes it hard to get the measurements!" (field notes, public teaching hospital).

Although fetal sex was always mentioned, it did not foster the construction of subjectivities or of fetal persons in this universe, contrary to what had been noted at the clinics.

The public maternity hospital, or the "holy scan"

Observations took place over a three-month period in 2003 during scans that were performed by two providers, Doctor Fernanda and Doctor Francisco.[16] The patients were seen by order of arrival; they were called in a loud voice by their number or the physician would simply shout "next!" from the ultrasound room. There was no place for the women to change nor were there any gowns. Most of them came alone. They waited on a wooden bench at the end of a hall; the length of their wait varied in accordance with the arrival time of the doctors, and it could sometimes last hours. While they waited, the women engaged in a hubbub of excited conversations, sometimes expressing their displeasure and disgust over the wait. But when anyone in a white coat appeared at the other end of the hall, silence once again reigned. After the outpatients were seen, it was time for the inpatients, including puerperas and women who had miscarried. They came in from the infirmary wearing hospital gowns and often times holding their own IV drip, attached to their catheter.

Rarely did more than five minutes elapse from the time the expectant mother lay down on the table, the scan was performed, the report filled out, and the woman released, with a piece of paper in her hand to be given to the secretary. The fact that Doctor Fernanda might at times answer her cell phone and talk on it did not change the length of the scan. This was the typical sequence of her scans:

> Doctor: Well now… Lie down and let me see your belly [applies gel, first images appear, measures BPD]. It's a boy. [M. doesn't react; doctor measures AC.][17] 28 to 29 weeks – six and a half months. Due date, January 22, 2004. You can get up. Next! (field notes, public maternity hospital).

The female doctor justified the precariousness of the scan and explained the rationale behind its brevity in these terms:

> They're very quick scans… But it's a supplementary test, right? … That's right. It's *only* a supplementary test. In fact, when there's some problem, I don't give them very much information because then [they'll] go to their doctor… And that might cause trouble… I give them *good* news *right away*… But it's just a supplementary test, like a lab (field notes, public maternity hospital; speaker's emphasis).

> This test provides minimal information, but she leaves here, she leaves happy because she's aware (field notes, public maternity hospital).

Services at the maternity hospital were solely assistentialist in nature, and scans were conducted in uninterrupted sequence. Doctor Fernanda vented on one occasion, and it left clear her desire to finish seeing patients as fast as possible:

> When the scan is over, Doctor Fernanda asks the patient how many are still waiting in the hall, and the answer she gets is 'none.' When the mother leaves, she comments to me: 'It rained! [suggesting that when it rains, fewer women come] Done. *Thank God!* Oh, darn, we've still got the inpatients' (field notes, public maternity hospital; speaker's emphasis).

Both doctors who were observed spent about the same amount of time on each scan. However, there were sharp differences in the kind of attention paid to the mothers-to-be. When the researcher first began her observations, Doctor Fernanda was relatively nice to the patients, but as time went on, she proved cold and impersonal. We attribute this to the fact that the observer's presence became "natural."

> Doctor: Take off your panties and lie down with your head up there, OK? Bend your knees... [gets transducer ready, with gel and sheath]. A little cold, a little pressure, OK? [M. cries hard; gestational sac containing embryo without a heartbeat appears on screen; doctor looks at image, talks while watching monitor]. Look, the baby's not alive. The heart's not beating. [M. cries hard; doctor seems like she wants the case behind her as soon as possible]. Now listen… when this happens, it's because the baby has some kind of defect, in its heart, its brain… You can make another one later. How old are you?
>
> M.: 23.
>
> Doctor: *You see!* You're young. The most important thing of all now is to take care of this. *This* can cause an infection. And as long as *this* is inside, you won't be able to get pregnant [M. sobs; doctor keeps on talking and gets up]. Stop by the room next door

> and then go up to the emergency department to take care of this [leaves room; M. gets off table crying hard] (field notes, public maternity hospital; speaker's emphasis).

Dr. Francisco behaved quite differently, even though his scans also lasted five minutes. He always stood by the table and asked the women what had happened; he spent a little longer on the images, pointing at the screen and showing them to the women. Moreover, even when the patients were teens, he always used the most respectful form of conversational address: *senhora* (roughly, ma'am). Although he did not explain a great deal, his behavior seemed less "bureaucratic" than his colleague's. The patients preferred him over her. Nevertheless, it was a "strictly medical" procedure and conversation was limited to symptoms during pregnancy or information about the fetus.

The available technology was very precarious. As the head of radiology said during first contact: "The Doppler is all fuzzy; you can't see a thing" (field notes, public maternity hospital, Doctor Violeta).

Doctor Francisco shared this notion of technological precariousness:

> 'With one sweep you can already see a number of things, the kidney, liver, limbs… but not extremities.' He confirms that they don't do [nuchal] translucency,[18] and I ask about Doppler. He says, 'Doppler's impossible. This equipment [room 2] is very bad. I got here one day and there it was. You know, the old story of bids, tenders… ' (field notes, public maternity hospital).

The reports were filled out by hand on a piece of paper that was then given to the women, with the instruction that they present it to the secretary. The images were not recorded. Because each scan was over so quickly, the only information provided was about age, fetal development, and "probable due date," without any interpretation. What was especially striking was that when a discrepancy was noted between the informed gestational age and the date indicated by the scan, there was no concern about looking for an explanation. At most, Doctor Fernanda would remark: "It seems healthy... it's moving" or "It moved, it's alive" (field notes, public maternity hospital).

We observed incongruities between the initial information provided by the head of gynecology and obstetrics at the hospital – that only one scan was performed per pregnancy (the morphology[19]), in the 20th week – and actual practice. In point of fact, several ultrasounds were performed per pregnancy, at different periods, and the morphology scan was not formalized in a report. Citing from field notes: "I ask about the morphology scan; Doctor Fernanda, appearing disconcerted, says, 'I always do the morphology, *fast*, to see if there's a problem, *but what we really do is the biometry of the fetus, that's what there's time for*'" (field notes, public maternity hospital; emphasis added). So even if there was ultrasound follow-up during the pregnancy, only biometric data were recorded, possibly to construct population statistics.

Sometimes the women would ask the female doctor if they could "see the baby;" occasionally, the answer was "I'll show you at the end," which she did by jerking the monitor around toward the patient and pointing at the screen. However, most of the time, Doctor Fernanda ignored the request. Doctor Francisco, on the other hand, even without being asked, "showed the baby" and was apparently pleased to obtain and see the images.

The topic of fetal sex surfaced at times, either at the request of the mother-to-be (a request not always satisfied) or because of an earlier scan done outside the hospital. The provider would sometimes furnish this information spontaneously, generally when the position of the fetus favored visibilization of the genitalia, but the information did not prompt subjectivizing comments, as occurred at the clinics.

Disciplining and normalizing attitudes were evident, even in the very limited contact between the woman physician and the mothers-to-be, such as this case of an obese woman:

> Doctor: Tell me something, why were you hospitalized?
> M.: Blood pressure.
> Doctor: I'm not going to say a thing! [M. laughs complicitly]. Difficult scan, right? [pretending to be angry] You know why, right?... Because of what I'm not even going to say, right?
> M.: And the sex, can you tell?
> Doctor: I don't know... I'm not going to tell you because... It makes everything hard... [I get the impression she's punishing M. for being so fat].
> M.: [reconciled to the situation] I know.
> Doctor: Sex... I don't know... you can get up... 25 to 26 weeks… 6 months. [fills out report] Take it to the room next door... [shouting] Next! (field notes, public maternity hospital).

Another example:

> Doctor: How old are you?
> M.: 12.
> Grandmother: 13!
> Doctor: I scold, I explain, I talk to the mother and the one who answers is the grandmother. Then I say [to M.] I'm talking to *you! You're the mother!* Sometimes they come in with their boyfriends, [who] usually want a boy; then I explain that it's the sperm that determines it, I tell them: *you're* the one who chose!... so there won't be a beating at home... [illustrating, as if talking to imaginary father] It's *your* fault! (field notes, public maternity hospital; speaker's emphasis).

The dynamics at this facility suggested a de-subjectivization of the pregnant women, mediated by the objectivization of the scans: how many weeks; size; weight; sex, sometimes; "it's moving, it's normal;" "it moved, it's alive;" due date. The set of data obtained at the facility appeared to fulfill the predominantly biopolitical role of the population monitoring of births.

Comparing the ethnographic studies

From the perspective of biomedicalization, a review of the field material gathered during the three ethnographic studies detected certain recurring aspects, which we have used for the purposes of comparison. These aspects were not static but rather interlinking, intertwined, and sometimes overlapping.

Time

Time management differed greatly among the three universes. Waiting was significantly different at the clinics when compared with the teaching hospital and maternity hospital, as if the time of middle- and upper-class women were more valuable than that of lower-class women; while not on purpose, this effectively reinforced a clear-cut hierarchy of power between providers and the public. More time was spent on the scans at the private facilities (including "showing the baby") to please both the clientele and, indirectly, the referring obstetricians. This time was dramatically shorter at the maternity hospital. At the teaching hospital, scans only lasted longer when necessary for teaching purposes; the length of the scan did not respond to any consumer logic. Consequently, at the public facilities, a pregnant woman's desire to have an image as an object of consumption did not influence the time factor.

Much more time was devoted to preparing reports at the private facilities than at the two public facilities. Time was also spent on image interpretation, at two levels: structure identification and significance (normal/pathological). It would have taken longer to make real-time interpretations; providing only biometric data made the scans go much faster than at private clinics. The evaluation of fetal pathologies was summed up at the maternity hospital by "it moved, it's alive," while at the teaching hospital this aspect warranted more time and attention during the scan, since any pathology would constitute an "interesting case" for the students.

Space and privacy

The space and level of comfort provided to the expectant mothers followed a logic of class hierarchy. Clinic C, which did not accept insurance and whose clientele was from more well-to-do classes, offered more comfortable, spacious facilities, followed by clinics A and B, while the public facilities offered meager amenities in this regard. At the maternity hospital, discomfort was the hallmark of care; the expectant women seemed to represent nothing more than another number for the purposes of calculating productivity.

The matter of patient privacy reflected a different logic. The fact that the women were accompanied by an audience at the private facilities often led to awkward situations, especially for the providers, for instance, when something transpired that did not make for a good "show" – like the detection of pathology. Yet it might be said that this "invasion" of privacy was a product of the woman's own initiative. At the teaching hospital, on the other hand, the presence and movement of students and the fact that providers who had nothing to do with the scan would enter the room prompted a lack of distinction between "inside" and "outside" (Chazan, 2011). The rooms were also invaded by myriad sounds, including the voices of the providers dictating information to secretaries outside the ultrasound room. However, in most cases, the expectant mothers did not seem to mind the situation. We asked ourselves whether the visibility that these lower-class women attained as teaching objects, which allowed them access to quite reasonable-quality health care, might not be experienced as something that had a positive value, while concern over privacy might reflect the observer's own class bias.[20] At the maternity hospital, the question of privacy did not pertain.

Health care and available technology

The available technology and the care rendered to the expectant mothers also followed a class logic. There was a hierarchy within the private facilities, while these in turn outranked the public facilities. If technology, along with the skill of the presiding doctor, was a highly valued differential at the private facilities, it neither influenced nor heightened demand at the public facilities, especially because the scans did not constitute a consumer good. Clinic C offered state-of-the-art technology while the maternity hospital fell at the other end of the scale.

Although care also followed a class hierarchy, it depended primarily on idiosyncratic factors, especially at the public facilities, where questions of market and consumption did not figure large. The focus on learning, for example, often relegated the comfort or discomfort of the expectant mother to the background. Beyond these idiosyncrasies, however, in some situations, when the woman's cultural level was more similar to that of the providers, it was noted that significantly different care was provided.

Doctor-technology-expectant mother: relation and hierarchization

In the private sector, technological sophistication was highly valued and, for quite obvious reasons, this created a hierarchy between the clinics. The providers positioned themselves in a way that masked the doctor-patient hierarchy, partly because they all basically belonged to the same social stratum and partly because of the implicit hierarchy of knowledge. At clinic C, where the clientele was exclusively self-pay, the doctor-patient hierarchy was often reversed: the expectant mothers made demands in a tone that brooked no refusal on the part of the attending physician. The women were referred to the clinics by their obstetricians and all of the providers observed in this ethnographic study were respected in the medical community. At clinics A and B, the choice might also be mediated by health insurance coverage.

In the public sector, where the standard was long waiting periods at both establishments and extremely short scans at the maternity hospital, time management itself lent the doctor-patient relation a hierarchical nature. At the teaching hospital, the valorization of so-called objective data, of obtaining "good images," and of "being gentle with" or "taking good care of" the equipment stood as evidence that technology and teaching were hierarchically interposed between doctor and mother-to-be. Yet idiosyncratic factors also entered in here: one of the doctors absolutely insisted on relativizing the data obtained with the equipment; he held that the ultrasound was a "supplementary test" and valorized a clinical approach that inverted the hierarchical position of technology in the triad.

Interestingly, the term "supplementary test" was also part of the discourse used by Doctor Fernanda at the maternity hospital, but in a very different sense; her approach seemed to denote an attempt to shirk any major responsibility regarding her performance as an ultrasound technician. Even though technology justified the department's very existence at this facility, paradoxically, or perhaps ironically, it seemed to be invisible within the hierarchy. This paradox was even more pronounced because technology was the element that could provide the biometric data that in turn yielded a population statistic on births – strictly speaking, one of the few pieces of information that the equipment could obtain. In terms

of a hierarchical scale, doctors were at the top, while women and technology occupied an equally inferior position.

Records of scans and medical reports

Scan records differed greatly among the three universes. At the clinics, the equipment itself printed out the numerical data and visual records. The women went away with an interpretive and descriptive report along with images; the latter, called "pictures of the baby," were highly valued by the clientele, triggering an ascending spiral of scan consumption. Our reading is that the reports that were drawn up not only reflected concern over good practice and test accuracy but were also part of a strategy for retaining the clientele of the referring obstetricians. In cases that prompted greater concern, the presiding doctor would call up the responsible obstetrician.

At the public facilities, printed images were never made available. At best, a printed report was handed out. Given this lack of images at both public centers, the obstetrician had to thoroughly trust what had been visibilized and affirmed by the ultrasound physician. At the teaching hospital, it would have been possible to print both biometric data and images directly from the equipment but this resource was never used, for reasons that never became clear. Considering the number of intermediary steps (taking notes on a random sheet of paper, shouting out the numbers to the secretary, relying on crude software), it was striking how rarely things went wrong with these reports. At the maternity hospital, the equipment was not capable of producing printouts and the quality of the images on the screen was mediocre. If we add to this the brevity of the scan, we can conclude that gestational age and, consequently, probable due date was the most that women got out of their reports. Mediation between the scan and the report was less disorderly and chaotic than at the teaching hospital, although all indications were that the reports were of little to no good in the case of fetal pathologies or for the purposes of accompanying the pregnancy. At both public facilities, the women who had been socialized into the ultrasound culture and wanted a "picture of their baby" had to turn to a private clinic, and they often did so.

Visuality: appropriating images

At the clinics, alongside diagnostic considerations, fetal images were the main focus of conversations between expectant mothers, those accompanying them, and physicians. The appropriation of images could transpire both in subjective terms, through various and sometimes playful attributions of meaning to the future babies and their subjectivization, or in material terms, through the provision of fetal images to take home.

Since the women were not the recipients of the images at the public facilities, the question of consumption was absent there and the women's contact with the fetal images was restricted to the time of the scan. At the teaching hospital, the students occupied this spot, and when the conversation was not about completely random topics among the providers, it centered solely on the medical, so-called scientific aspects of the scan. The mothers-to-be were rarely included in the conversation and there was no opportunity to assign meaning to what they were seeing. The physicians might sometimes explain the visibilized parts of the fetal body,

like the more readily identifiable feet or hands. On occasion, depending on the mood of the presiding doctor, he or she might comment "Look how cute!"

This found even more radical expression at the maternity hospital, where the fetal images were not the object of any comments on the part of the women, given the poor quality of the images, the brevity of the scans, and provider attitudes. Even if there were some idiosyncratic characteristics in how the providers dealt with both images and women, it was as if the women had been dispossessed of their babies-to-be from the perspective of the production of images. For two or three minutes, they saw fleeting gray shadows, if they saw anything at all, and then they were summarily dismissed.

Constructing bodies and subjectivities

Based on the aspects compared so far, the situation at these universes can be summarized in three levels, depending upon the expectant mother's social class:

(1) At the clinics, the expectant women interacted with the images and, merging visuality and bodily sensations, constructed a certain type of pregnant body. Their fetuses were assigned intentionality and idiosyncrasies, transforming them into subjectivized, named subjects even before their birth.

(2) At the teaching hospital, the bodies of the mothers-to-be were painstakingly examined by the scan "for the sake of teaching." In tandem with this pedagogization of their pregnancies, they were the object of good-quality medical care, albeit subject to the precariousness of the public health system and its other limitations. Pregnant and fetal bodies were valued in that they were useful. The expectant women themselves seemed to be invisible as subjectivized individuals.

(3) The pregnant women at the public maternity hospital and their fetuses (theoretically) scanned were likewise invisible ("what we really do is the biometry of the fetus; that's what there's time for"); they only seemed to be there to provide statistics: staff productivity, services provided by the public health care network, reproductive policies, and population statistics on births and deaths. At the time of these observations, the media were already publicizing ultrasound, which means these expectant women were not unaware of what the technique could accomplish. But in their case, there was simply no possibility that the scan would have some transformative meaning in the process of their pregnancy.

Final considerations

It should be underscored that we do not consider the universe of the clinics as an ideal standard – that is to say, ours is not a "clinic-centric" perspective. In comparing the three ethnographic studies, we were interested in discussing the relation between the expectant women's access to relatively respectful healthcare service, the logic of the commodification and stratification of health, and the ultrasound scan as a co-producer of pregnancies and pregnant and fetal bodies. In addition, data showed that interactions between the provision of healthcare services and the production of biomedical knowledge at the teaching hospital were also determinants in the local configuration of the biopolitics of bodies via ultrasound.

The field of ultrasound appears to encompass a patchwork of traditional biopolitics, medicalization, and biomedicalization, depending on the social stratum of the expectant mothers and on how knowledge production, technology, provision of services, and capital are interwoven. In this sense, we can say, roughly speaking, that the private clinics had fully entered the age of biomedicalization by 2003, while the logic of medicalization held at the teaching hospital. At the maternity hospital, population statistics seemed to wholly guide the rationale behind scans. We can infer that the following were constructed in the three universes, respectively: transformed and (bio)medicalized bodies; useful, pedagogized, and medicalized bodies; and, lastly, docile, disciplined bodies.

Our analysis showed that, in the intertwining of technology and social interactions, ultrasound constructed three different objects, in conjunction with sub-products that reinforced the stratification underlying their production, in a process of ongoing feedback. At the universe of the clinics, this object was a fetus-baby-person with a name, photos, and videos, which could be summed up in the expression "*meio quilo de gente*!" (literally, half a kilogram of person), and this fed the consumption of scans. At the teaching hospital, a fetus-patient-model was constructed and transformed into medical knowledge; here, as an object of study, the mother-to-be was the "roadway" for obtaining knowledge and the very reason for the existence of the ultrasound department. Lastly, at the maternity hospital, through the *exame bento* (holy scan), a fetus-number and terse diagnostics were produced to feed statistics.

It should be noted that this picture displays nuances and overlapping elements. We have offered this division to emphasize the most evident patterns in the stratification and simultaneous construction of knowledge production and in the provision of services and technology, without losing sight of the fact that these processes are dynamic. In other words, medicalization is present within biomedicalization, disciplining and normalizing are present within the pedagogization of bodies, and implicit medicalization is present within the concern over producing population statistics on pregnancies and births. These data help us understand the configuration of contemporary biopower. While it may be undeniable that recent decades have witnessed the emergence of something new in the direction of biomedicalization and a molecularized epistemology (Rose, 2007), we would add, based on the data discussed here, that this picture is neither homogenous nor does it depend solely on the historical moment. In the observed universes, it is nuanced and primarily comes streaked and infused with social stratification and, in the final analysis, stems directly from the growing process of the commodification of health.

NOTES

[1] All names in the article are fictitious; first names have been used as a way of indicating the physician's gender. Doctor Lúcia worked at one of the private clinics observed in this study.

[2] Lilian Krakowski Chazan's research project, which underpinned her doctoral dissertation in Collective Health, was approved by the Ethics Committee of the Institute of Social Medicine at Rio de Janeiro State University (IMS-Uerj) in October 2002.

[3] The project was approved by the hospital's Ethics Committee (research protocol 10/2008, CAAE: 0006.0.361.259-08, CEP/ME-UFRJ).

[4] Abortion is a crime in Brazil, except in the case of rape or when the mother's life is at risk; even in those cases, physicians at public hospitals can refuse to perform the procedure based on "questions of conscience."

[5] This study re-analyzed field material from different universes and explored unpublished observational data, drawing broadly from field notes that were digitalized and filed by Lilian Krakowski Chazan over the course of her various ethnographic studies.

[6] In order to protect the privacy of informants, we refer to the observed facilities as clinics A, B, and C; public maternity hospital, or maternity hospital; and public teaching hospital, or teaching hospital. The observations at the clinics and at the maternity hospital were conducted as part of a doctoral dissertation (Chazan, 2005); however, observations at the maternity facility were not analyzed on that occasion. The decision was made to observe a public hospital in conjunction with the ethnographic study for the dissertation (Chazan, 2005) in order to have a parameter for comparison with the clinics. Therefore, this material was never published. The dissertation gave birth to a book (Chazan, 2007). The research at the teaching hospital was conducted as part of post-doctoral studies and resulted in a report (Chazan, 2009), currently stored at the library of the Institute of Social Medicine, Rio de Janeiro State University, but not available to the public for reasons of confidentiality; it also resulted in an article (Chazan, 2011).

[7] This classification was based on the observation of dress, accessories, and language, as well as on clinic location. The socioeconomic profile of the expectant mothers was not investigated.

[8] On this topic, see special issues of *Physis* (2010) and *Cadernos de Saúde Pública* (2013).

[9] "Visibilize" is an emic term, meaning to "make visible" that which the eye could otherwise not see. We reserve "visualize" only for direct visual perception, as when images are seen on the screen. This topic has been addressed in earlier papers (Chazan, 2005, 2007, 2008, 2009, 2011).

[10] There are various types of ultrasound scans: the simplest, with its well-known gray 2D images; Doppler, which is used to assess fetal blood flow; and 3D. The more sophisticated equipment performed all three types of scans while the older equipment could only do the simplest.

[11] In 2003, when the observations took place, this was a top-of-the-line television.

[12] The equipment was deemed "old" in this universe.

[13] In 2003, fetal surgeries were already being performed outside Brazil (Chazan, 2005, p.176-177). In 2009, the teaching hospital at the University of São Paulo (Hospital das Clínicas) began performing this type of intervention (Nova..., 20 fev. 2009).

[14] We have designated the residents as R1, R2, and R3, depending upon their rank.

[15] Oligohydramnios is a low level of amniotic fluid.

[16] See note 1.

[17] Biparietal diameter (BPD), femur length, and abdominal circumference (AC) are parameters used to assess gestational age.

[18] Nuchal translucency (NT): measurement of the thickness of the fold of skin (nuchal fold) at the back of the fetus's neck, which is a parameter used to assess the risk of chromosome abnormalities and whether there is therefore a need for more invasive testing, like amniocentesis. Its use is recommended from weeks 11 to 13 of the pregnancy.

[19] The morphology ultrasound looks for fetal anomalies.

[20] Nevertheless, it may be that this visibility had to do with the "images" of the pregnant bodies produced for teaching purposes and did not necessarily translate into the women being perceived as subjectivized subjects.

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